

Wm. Harrison







# THE SPINE:

ITS CURVATURES AND OTHER DISEASES,

THEIR

SYMPTOMS, TREATMENT, AND CURE:

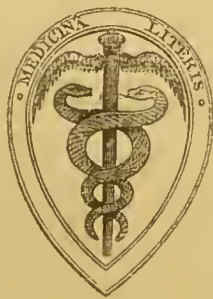
To which are added some

REMARKS ON PARALYSIS.

BY

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## P R E F A C E.

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WHEN I reflect upon the fact of so many writers having of late years contributed each their volume, or volumes, to swell the records of Distortions of the Spine, and deformities in general, I am almost deterred from venturing to intrude upon the notice of the profession and the public this short treatise; nor should I ever have sent it to the press, had I not felt that a gap still remained, which afforded an ample field for the scope of my own efforts, as well as for that of a multitude of others, for much has yet to be achieved before we can say to a certainty that such and such a case of Spinal Distortion is curable. Moreover, since I feel that an excuse is required of me for the step I have taken, I will plead the following circumstances as being particularly potent in inducing me to enter into the arena of this greatly agitated question.

The extreme prevalence of Spinal Deformity, occurring too, as it so frequently does, in the upper

ranks of society—not attacking the aged, or necessarily the infirm, but seizing upon the young and beautiful of the land—I allude more especially to Lateral Curvature—and thus for ever blighting the hopes of those whose career, but for this circumstance, had been so strikingly different, at once affords a reason for instituting a careful enquiry into the true nature of the disease in question.

Secondly—Without being at all ignorant of the various works that have from time to time appeared upon the subject, the majority of which I have made it my especial duty to peruse, not only those in the English language, but also many in French and German—I cannot say that, in a single instance, I have ever been able to select any one treatise, that has appeared to me to contain *all* that is necessary for enabling us successfully to contend against these insidious and distressing diseases. It is equally true, however, that I have rarely laid one down, unless indeed it has been the production of one of the many unprincipled empirics, who call down ignominy upon this branch of the medical profession, without finding myself a step farther on



in the pathway that must ultimately lead to success and renown. In proof of this, I need only allude to the following excellent works :—

Pott's Works, vol. iii

Shaw, on Distortions of the Spine

Bampffield, on Curvatures and Diseases of the Spine

Jarrold, on Curvatures of the Spine

Dods, Pathological Observations on the Rotated and Contorted Spine

Ward, on Distortions of the Spine

Tamplin, on Deformities

Baynton, on the Spine

Lonsdale, on Lateral Curvature of the Spine

and very many others in English.

### In French,

Andry, l'Orthopédie, l'Art de prévenir et de corriger dans les Enfants les Deformités du Corps

Portal, Observations sur la Nature, et sur le Traitement du Rachitisme

Desbordeaux, Nouvelle Orthopédie

Delpech, de l'Orthomorphie

Lafonde, sur les principales Difformités

Guérin, Mémoires sur les Difformités du Système Osseux

### In German,

Sommerring, ueber die Wirkungen der Schnürbruste

Wenzel, ueber die Krankheiten am Rütthgrathe

Jörg, ueber die Verkrümmungen des Menschlichen Körpers, und eine Rationelle und sichere Heilart derselben

Stromeyer, ueber Paralyse der Inspirations-muskeln

all of whom have contributed in an eminent degree to the fund of information that now exists upon these subjects.

Let it not be inferred from the foregoing, however, that I claim for my own work any intrinsic merit, that does not equally pertain to the writings of those above-mentioned, I simply consider that something is yet wanting to facilitate and render more perfect our diagnosis and treatment of diseases of the Spine; and my object will be attained, my reward reaped, if I can only succeed in adding as much original information to the existing stock, as has already been contributed by the least meritorious of those who have preceded me — for it is only by each one adding his mite to the general store, that we can hope to arrive at any thing like perfection in these matters.

One advantage I certainly possess over my predecessors — it is, that I have had the opportunity of reflecting maturely upon the information afforded by them — of putting their advice into practice amongst a very large number of cases — of testing its value, and upon it, of basing my own views as to the treatment requisite to promote recovery;



and, with any thing but a desire of concealment, I cheerfully acknowledge that I have derived the utmost benefit from a careful and repeated perusal of their works, and a deliberate trial of the plans therein advocated.

Thirdly — From a variety of circumstances I have, in an unusual degree, been thrown in the way of attending to, and watching the progress of Spinal and other Distortions. My late Father was amongst the first of those who devoted their time exclusively to the investigation and scientific treatment of these particular diseases; and from his zealous enthusiasm in the cause, he did not allow a long period to elapse, before he compelled me to take an active part in his avocations, so that at a very early age I found myself engaged for a considerable number of hours daily, in attending upon the sufferers from these peculiar affections. For some time prior to my Father's decease, I continued in the active exercise of these duties under his immediate superintendence and instruction; and, during the nine years that have now elapsed since his death, I have been unremittingly engaged in the same practice; and as I fulfilled the office of

House Surgeon at the Asylum for the Treatment of Spinal Deformities during a period of six years of the above time, I have had the advantage of testing the merits of the various methods of treatment that have from time to time been adopted in that institution, in the instances of many hundred cases of deformity: and thus I have had a large field for making practical observations upon those essential points, which must be borne in mind by such as undertake the management of these particular diseases. Moreover, feeling that much was doing in various parts of the Continent for the relief and cure of these affections, I was unwilling to rest contented with a knowledge of the English mode of practice only, and have therefore made it my business to visit the various establishments for the treatment of the several kinds of distortions, in Paris, Brussels, Munich, and other Continental cities.

Having adopted these measures for my own especial instruction, and having deduced, from what I have seen, my own views upon the subject of treating deformities, it is not my intention in the following pages to enter into a critical analysis of

the plans advocated or pursued by others, as I consider that such a mode of procedure would necessarily entail much loss of time, without returning a compensating degree of reward. Touching, therefore, upon just so much as may be useful for practical purposes only, I shall leave it to others to discuss the merits or errors that attach to each individual theory or practice; for it is not to him who confines himself to one especial plan of treatment, to the exclusion of all that is useful in others, that must ultimately descend the palm of success; but the true laurels of reward await that one, who shall first succeed in making the most judicious selection from all that has yet been advanced on these matters.

Such has been the initiative course that has conducted me to the present era, and having upon all occasions studiously endeavoured to turn to the best advantage every opportunity that has occurred to me; and, moreover, having entirely satisfied my own mind as to the true nature of these diseases, and the treatment that is necessary for effectually grappling with them, I now come before the world, with such a degree of diffidence as may be suffi-

cient to shield me from the withering remarks of critical observers, to advocate the adoption of such methods as I believe to be most rational, most efficient, and most freed from the tendency to exert injurious influences, either upon the external or internal structures of the human frame. I can only add, that as I advocate, so I resort to them in my own practice, both at the Hospital, to which I am Surgeon, and amongst private patients, and I rarely find them unequal to the production of those results that are the aim of all who have the welfare of their fellow-creatures near at heart.

I should not omit to mention, that many of the views here advanced upon the treatment of Spinal Distortions, are founded upon the suggestions of various other writers—a circumstance clearly unavoidable, since to every author we allot a proportionate degree of merit; but I have also to introduce to the notice of the profession some points that I believe to be essentially new, and, in particular an instrument for the treatment of Lateral Curvature, which, in addition to being original, is proving itself more serviceable than perhaps any mechanical contrivance that has yet

been proposed; and I only hope, that in the hands of other practitioners it may prove as beneficial as it is doing in mine—a hope, respecting the realization of which I entertain no doubt, provided it is employed as an adjunct in the treatment, rather than relied upon as the sole means of promoting recovery.

It is needless to pursue this topic farther; I will, therefore, proceed at once to say a few words relative to the arrangement I purpose adopting in the following work.

Having given a brief outline of the general nature of deformities, especially those involving the Spine, I shall, for the convenience of reference and perspicuity of detail, go on to consider each individual affection under the following heads:—

First—“Lateral Curvature.”

Secondly—“Caries of the Spine,” or “Angular Projection.”

Thirdly—“Paralysis,” as caused by disease of the Spine.

Fourthly—“Psoas Abscess.”

Fifthly—“Excurvation,” or “Posterior Curvature.”



Sixthly—"Incurvation."

And lastly, after a few words upon "Rachitis, or Rickets," I shall conclude with some remarks upon "Spinal Irritation," or "Hysterical Affections of the Spine," endeavouring to point out the difference between the "true" and the "simulated."

Such a method of procedure will, I think, meet all that is essential in the proposed discussion. Adopting, then, this mode of classification, I shall first describe the symptoms of each affection; then its causes, and pathological effects; and, lastly the treatment that is to be adopted for its palliation or removal.

With a view to the important object of more strongly impressing upon the reader's notice the particular phenomena, which serve to characterise the nature and treatment of each affection, I purpose introducing into the following pages a detailed account of cases that have come under my own observation, as I consider that the facts pointed out by such means are much more striking, than when simply alluded to in a general description.

I have purposely omitted introducing engravings taken either from life or the cast of patients, who

have been under my care, simply because my own views and feelings are at variance with the “look upon this picture and on that” system—more especially of late, since we see this description of attractive illustration appended to every ephemeral pamphlet that is put forth to mystify and dazzle the unwary—no matter whether it be to laud the wonderful efficacy of some particular oil, or to recommend an improved peruke: moreover I trust that I may venture to entertain a hope that the detailed account of cases, with the names and addresses of the patients attached, which I have endeavoured to draw up with precision and accuracy, may be deemed a course more in accordance with professional dignity, and professional etiquette, than having recourse to artistical decorations.

If it be said that I have taken upon myself to call into question some of the prevailing quackeries of the day, without sufficient grounds to justify such a proceeding, then will I not attempt to deny that I may have erred. I would rather appeal to the sympathies and gentler feelings of my professional brethren, and at once lay before them the

object I have had in view in following such a dangerous pathway.

There are but very few who would wish to dispute the assertion that the subject of my present small treatise, is one which has long been, and to a limited extent still is, exposed to the most unprincipled empiricism, not only at the hands of a small portion of the medical profession, but also with mechanical instrument makers, German outcasts, and even of men originally earning an honest livelihood at the cobbler's awl; and this, too, when its importance and difficulties should obtain for it an exalted station in that catalogue of human ailments, which it is the surgeon's proud province to be enabled to palliate or rectify. With the deepest sincerity, then, let me aver, that however unequal I may feel myself to the task, I have the dignity of my noble calling so near at heart, that I would consent to suffer the contumely and disapprobation of those who may feel themselves aggrieved, could I by so doing secure to myself one sentiment of approval from that large majority of medical practitioners, who feel a greater reward in the honour they may obtain, than in the mere pecuniary ad-



vantage that results from their arduous avocations ; and could I, at the same time, but in the very slightest degree, assist in raising the subject of spinal and other distortions to their due and well-merited position, my reward would be doubly rich.

The Hospital, to which I have the honour to belong, was founded by my late Father some fourteen years ago, for the express purpose of instituting a scientific investigation into the true nature of bodily deformities. It has now grown into a large and important public charity, and my sole object, as well as that of my colleagues, is to carry out in its wards that system, which is most rational, and most in accordance with true science, and divesting that treatment of every mystery or concealment, its wards are open for the inspection of the world ; and whoever feels an inclination to adopt the plans we advocate has only to visit the Hospital to become initiated. If we fail in our efforts, it is our misfortune rather than our wilful error.

As far as regards my own feelings, I can only add, that I never experience more pleasing emotions, or derive such a rich recompense for my

humble endeavours, as when I find the principles and views I advocate, approved of and sanctioned by others; for I can but feel that such circumstances must tend to the advancement of my own position, and to the benefit of the Hospital in which I practice.

Soliciting, therefore, the sympathies and consideration of medical men generally, I earnestly hope that I may be spared the condemnation and rebuke of those whose bounden duty it would be to slight and disown me, were my slender efforts exerted solely for the sake of personal vanity, or personal aggrandisement.

At the earnest solicitation of several of my late Father's friends, many of whom have experienced benefit from his unceasing zeal in the treatment of deformities, I shall from time to time introduce to the reader's notice, such facts as I have collected from his MSS., and which I may deem useful to the advancement of the present enquiry.

In conclusion, I would appeal to the reader in behalf of my short treatise, soliciting him not to condemn it on account of its brevity, or indeed until its pages have been glanced at; if then he

finds, however, that there is just cause for disapproval, I would only urge my motives for writing the work as a means of procuring his lenient criticism, and not put into the scale the manner in which my task has been executed.

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# THE SPINE.

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## CHAPTER I.

### GENERAL OBSERVATIONS. — HEALTHY AND DISEASED CONDITIONS OF THE SPINE.

TAKING it for granted that the principal anatomical characters of the spinal column are perfectly familiar to the majority of my readers, I will merely say—for the benefit of the non-professional portion of them who may chance to refer to these pages—that it is composed of certain separate bones, named *vertebræ*, which are divided into seven “cervical,” twelve “dorsal,” and five “lumbar;” that each vertebra consists of a solid portion, termed the “body;” of certain projecting plates, called “processes;” and of articulating surfaces, by means of which it is joined to the vertebra above and below—that throughout the column exist certain holes, named “foramina,” which serve for the transmission of nerves as they pass out from the *medulla spinalis*, which is contained in the vertebral canal. Attached to various parts of the spine, and almost surrounding it, are certain muscles and ligaments, the former

of which provide for its mobility, whilst the latter maintain the due positions of the bones one to the other.

The solidity of the vertebral column is secured through the medium of the broad osseous bodies, which are placed in accurate relation one above the other, so that the superincumbent weight of the head and shoulders is transmitted through the immediate centre of each bone. These osseous bodies, however, are not placed in actual contact with each other, clearly because such an arrangement would greatly have prejudiced, if not entirely destroyed, that degree of motion which is essential to the habits and wants of the animal kingdom. To ensure, then, the utmost amount of mobility—at the same time giving to the spine a degree of rigidity almost equalled to that of a solid bone—and for the purpose of lessening to an immense extent the liability of fracturing the vertebræ—as well also as to avoid the frequent concussions that would have been transmitted to the brain, had a continuity of solid material existed—we find that there is placed between the bodies of each two vertebræ, a firm, dense, yet highly elastic fibro-cartilaginous structure, which is known by the name of the “inter-vertebral substance,” or “inter-articular fibro-cartilage;” and which is ever exerting its elasticity to bring back the spine to its natural position, when, from occupation or other cause, it has been



thrown into a bent or curved posture—to facilitate motion—to admit of various attitudes being assumed—to prevent, or materially to lessen, the chances of violent shocks being transmitted to the cerebral centre—and, at the same time, serving to bind one bone to the other, and thus most strongly assisting to avert the possibility of a dislocation in this important region.

Passing between various points of the column in general—as also between each two vertebræ, and the different portions of each two vertebræ in particular—are certain ligaments, which, in addition to serving the office of retaining the bones in their due and normal position, exert a most powerful influence in counteracting the effects of muscular action, and form an important accessory power for bringing the spine back to its natural form, when it has been bent into any of the various positions that its extreme flexibility will admit of.

Lastly, the muscles—five layers in all, which nearly surround and cover in the entire column—act not only as the machinery by means of which its mobility is procured; but they also materially assist in binding one bone to the other, and thus producing that rigidity and strength, which is so characteristic of a part, where we see at the same time such a wonderful provision for procuring almost illimitable motion.

Such is a very general outline of the anatomical

characters of the spine; and when all parts of it are equally well developed, and each is acting in its due and appointed sphere, it may be readily conceived how perfectly every office it is destined to perform may be effected: but if, on the other hand, one portion is faulty, or vitiated, or possibly perverted in its action, whilst the others retain their normal condition, then will it be equally apparent that a rapid impairment of symmetry and function must surely supervene—for irregularity of muscular action, or indeed of any of the vital phenomena, cannot long go on, without inducing a corresponding change in the structures which are affected—the effects of which change will bear an exact ratio to the importance of the part that is implicated.

It will be my object, then, in the following pages to endeavour to point out those changes that are the consequence of any of the irregular or morbid actions above-mentioned—since it is to them that we must look for the more frequent, if not the universal, causes of bodily deformity.

We can scarcely contemplate the structure of the spine, and not be forcibly impressed with the beauty and perfection of its mechanism. At once a pillar of support for the head and shoulders—a firm base of attachment for the ribs—a canal for the transmission of the nerves, and even the prolongation of the brain itself, the medulla spinalis—its motions are almost unlimited and boundless:



and, during health at least, it is scarcely too much to say, that every attitude may be assumed without in the slightest degree permanently affecting the symmetry or proportions of its general arrangement. From the very perfection of its conformation however — admitting as it does of such a variety of offices — it is rendered especially liable to become deranged, when the health is impaired, or the constitution enfeebled. At such times it is that we find it yielding and assuming a serious degree of curvature in those persons who are suffering from physical debility; and even the simplest cause, that may call into activity the muscles of one side more constantly than those of the opposite, will, in some cases, give rise to a deformity that it will take many months to remove. In proof of this, I would instance the fact of nursery-maids being particularly liable to suffer from lateral curvature of the spine, clearly from the habit of always supporting their charge upon the same arm.

Various and almost numberless are the circumstances that may predispose to spinal curvatures; but amongst the first that should be mentioned is muscular debility, a condition that may be induced by a multitude of different agents. It has been said, and there appears to be much truth in the assertion, that in the phenomena of growth, the bones take precedence of the muscles; and that the elongation of the latter is, in the first instance,

mainly dependent upon the wider separation of their points of attachment—a statement, that would appear to derive considerable stability from the fact of observing, that lateral curvature is by far the most frequently met with amongst those who have grown rapidly. In such persons the muscles are thin, attenuated, and pale; whilst, in such as are of short stature, both the osseous and muscular development appear to be so equally poised, that the difference in their relative proportions, if any really exist, fails to impress itself upon us.

Admitting muscular debility to be one of the most frequent agents in the production of the curved spine, especially of the lateral deviation, we shall cease to be surprised at the large number of persons who are thus affected, since they will bear a certain proportion to the causes that give rise to the loss of muscular power. And what are these causes? Amongst the most striking may be mentioned—rapid-growth—sedentary occupations—severe and protracted illness—derangement of the digestive organs—and, in the case of females above the age of puberty, a vitiated condition of the menstrual function—any one of which is in itself adequate to the production of a debilitated and enfeebled condition of the system in general, and the organs of locomotion in particular: and since we have seen that, unaided, any single one may give rise to this condition, their effects will clearly be pro-

portioned to the number of them that are in operation at one and the same time. And may not all of them be coexistent? Doubtless they may; for since the usages of modern society call so much more largely upon the mental than the physical powers — particularly in the instance of young females during the period allotted to education — it is but too obvious that a life of comparative bodily inactivity must be enforced, in order to bring the mind up to the present standard of conventional refinement; and there are but few children whose constitutions are sufficiently strong to withstand the debilitating influences of a routine, at once so contrary to their nature, and so opposed to the impulse of early youth: hence digestion, secretion, nutrition, and the health generally, becomes impaired; and hence, too, is laid the foundation of that long train of evils, that so frequently ends in bodily deformity — a deformity involving the spine more frequently than any other part, simply because it is less able to resist these debilitating influences.

The causes that induce debility, do not alone affect the muscular apparatus; but both directly, and indirectly, they influence also those structures to which are mainly committed the charge of preserving the relative position of one vertebra to another, I mean the ligaments.

It has already been stated, that in addition to performing the important office of volition, the

muscles materially assist in preserving the integrity of the spinal articulations; and it follows, as a matter of course, that they being weakened, and their support being entirely or comparatively removed, the whole duty of maintaining the relative position of one bone to the other is transferred to the ligaments, which, even in their most healthy condition, were never destined to perform, unaided, this office; and much less are they competent to effect it now, paralysed as they are by the same agents that were instrumental in producing the muscular debility. They are unwilling to yield, however, and for a time they struggle against the newly imposed tax: and the unnatural exertion that is now required of them tends still more quickly to enfeeble their condition. They become elongated, thin, and paler in colour: in a short time the spine ceases to acknowledge their control; and, being endowed with no inherent power to support itself, it is unable to bear up against the superincumbent weight of the head and shoulders, which is constantly pressing upon it; thus it gradually or rapidly sinks, not from the effects of disease or degeneration of its own structure, but simply from the loss of those natural supports which were essential to the preservation of its perpendicularity.

This debility of the muscular system may either be the primary cause of spinal distortion; or, less

frequently, it may supervene upon a curvature that has been produced through some other agency, when it will exert its influence in a secondary degree. The truth of this assertion will be sufficiently evident by a reference to the following physiological fact.

The muscles connected to the spine, as well as those attached to the other parts of the body, are so disposed, during health, as to be subject to a certain degree of tension—a condition that can only be procured whilst their points of attachment maintain their relative distance from each other; and it follows, as an inevitable consequence, that no change can take place in the position or form of the bones, without periling this salutary degree of tension, the ultimate effect of which will be to produce debility of the muscular system: for it is a fact well known to physiologists, that a certain amount of tension is essential to the perfect nutrition of muscles, and any augmentation or decrease of it must therefore render their developement defective—a condition that cannot long persist without inducing debility, the degree of which will be proportioned to the extent of the nutritive impairment.

It matters not whether the two extremities of a muscle be approximated to, or separated from each other—the effect of both conditions will be the same, though produced by opposite causes—the



normal and essential degree of tension is destroyed, and muscular tonicity is greatly impaired.

The foregoing fact is highly important, not only as it explains in a great measure the cause of deformity, but more especially as it points to an important indication in the treatment necessary to bring about recovery; and, for both these reasons, we should be ever careful to keep it prominently in view.

Taking into consideration this provision for muscular developement, it will be more than superfluous to point out the destruction of harmony between the two attachments of a muscle, that must await upon any deflection of the spinal column; for it must be perfectly clear, that a lateral curvature, however slight in degree, will on one side cause a diminution, and on the other an augmentation of the above-mentioned tension—a circumstance that must give rise to loss of tone in the affected muscles.

When muscular power becomes enfeebled either by disease, old age, or other cause, the body is generally thrown into such a position as shall cause the least possible expenditure of the remaining force; hence, in old people, the body falls forward, the muscles being no longer competent, without at least a forceable effort, to maintain the trunk in the erect posture.

It has been stated by most authors, who have written upon the subject, that the curability of

lateral curvature ceases after a certain period of life. Now, without at all denying this fact as applied to the majority of instances, I cannot help feeling that many curable cases have been abandoned from a too general adoption of this doctrine; for instances are met with, and in pretty elderly people too, in whom the affection may be removed, where other circumstances are favourable to the supervention of cure—more especially where the patient is able and willing to devote a considerable period to the object of procuring such a solid advantage—and I am pleased to be enabled, from actual observation, to say, that persons, who have long passed the period of growth, need not be without hopes of very considerable relief, if not of complete restoration.

I consider that there are few things more erroneous than attempting to lay down one universal and undeviating PLAN of treatment for the relief of lateral curvature of the spine; yet I have rarely found a work, in which the author has not laboured to establish some particular theory of his own, as if one especial method were the only thing requisite for contending against the various phases of this insidious affection. Now it appears to me, that such a course is not only injudicious, but replete with error; since it is the circumstances attendant upon each particular case that can alone lead us to determine upon the best and most judicious course of remedies.

It has yet to be generally known, that two cases of lateral curvature—presenting as nearly as possible the same general and physical characters—have frequently to be combatted by means almost entirely opposite: yet so it is, and I greatly doubt if those who have so strongly advocated the recumbent position, either the prone or the supine—as well as those of later date, who attempt to show that the employment of mechanical support is the only thing necessary to the cure of this affection—will not, at some very early period, discover their error, and be glad to avail themselves of the adventitious assistance afforded by the writings and practice of others. For my own part I am fully prepared to admit, that every system of treatment possesses some inherent excellence; and it is to those who can best select from such systems that which is really useful and good, that must ultimately revert the laurels of success.

That all persons, who have a tendency to lateral curvature, or other affection of the spine, should at once seek medical advice, is a truth, the value of which is only just now beginning to be appreciated; and it is to the progress that has of late years been made in correctly ascertaining their real nature, and the certainty with which they will increase, unless effectually arrested, that must be attributed this important reformation.

Formerly the supposition was, that by increasing



the general strength of the patient, she would outgrow the deformity—than which a more pernicious view could not have existed; for it occasioned the loss of that most valuable of all time, the period when cure was easy and certain.

Even at the present day it is very common for delicate children, in whom are evidenced the symptoms of lateral curvature, or incipient distortions of the limbs, to be ordered to the sea-side, with injunctions to bathe and persevere in the administration of tonic medicines—the sequel of which is, that the majority of cases fail to recover, the distortion increases, the parents get anxious, and at length the only path that can lead to benefit is zealously sought and eagerly pursued; but, alas! it is often at a period when many months of careful and unremitting attention are requisite for the removal of an affection, which, had it been judiciously grappled with at its commencement, might surely and speedily have been arrested. And yet these are the results of advice for which hundreds of guineas are annually paid to those whose time is too much engrossed to give to the subject that amount of attention, which it so urgently demands.

The period required for the removal of deformities is subjected to the widest variation—and its length or brevity does not always bear an exact proportion to the severity of the case—for a curvature of a tolerably severe degree may occasionally

yield more rapidly than one of a slighter nature; and it would appear, that the time necessary to bring about recovery, is influenced more by the period that the affection has existed, than by any other circumstance—of course, the age and constitution of the patient have also much to do with determining this matter.

The circumstance of females being so much more liable to suffer from lateral curvature, than those of the opposite sex, is so well known that it appears almost needless to allude to it here. Various explanations have, from time to time, been given to account for this phenomenon; but that originally proposed is the one generally received in the present day, and doubtless it is the correct one; namely, that it is caused by the more sedentary employments of young women in the upper ranks of society. Did it arise from any inherent peculiarity of the female constitution, then we should expect to find the lowly equally affected with those of higher birth; but such is by no means the case, for it is an affection that appears to follow on the very heels of refinement, and muscular inactivity: hence, young girls who are submitted to the routine of a modern education—milliners, and those who sit constantly at their needle—artists, and such as lead a sedentary life—are particularly liable to be selected as its victims.

The frequency of the dorsal curvature and pro-

jection of the ribs being towards the right side, has also furnished matter for various theories, many of which have displayed considerable ingenuity, though I believe none have entirely met the subject; indeed it is a phenomenon involved in much mystery, and one that will in all probability never be satisfactorily explained.

Taking, for instance, the supposition — and it is the favourite one — that the more frequent use of the right arm, and right side of the body generally, is the chief agent in producing this peculiarity, we find a serious difficulty to its adoption in those cases where, though the right side has been employed in its accustomed degree, and the patient has been subject to all those circumstances that are supposed to favour a projection towards the right side, still the left is the one selected for the attack. Notwithstanding this flaw, however, evidence is still very strong in support of this theory; and I believe it to be the one best deserving acceptance. But then it is very materially aided in its operation by the effects of position — *mal-position*.

It cannot fail to strike one that almost every attitude, assumed by persons engaged in sedentary avocations, is tending to elevate the right shoulder, and draw the dorsal portion of the spine to the same side: this is especially the case in young girls, who are submitted to the high-pressure system of education, now so much in fashion — thus, writing,

drawing, painting, playing on the harp or piano, and even working, particularly at the all-attractive crochet, are each tending to the same end. Even when relaxation from study is permitted, it is only to allow of that still more fatiguing process, a measured walk, such as extreme formality and decorum have divested of its beneficial influences; and the poor child, who is sufficiently unfortunate to obtain this indulgence, is generally found walking with her right arm resting upon her companion's left; and thus, in addition to the tendency of such a position to perpetuate the evil consequences that have been induced during the hours of mental exertion, she is debarred from the possibility of engaging in those active exercises and recreations, that are so essential to the preservation of her health and her figure, and which alone can counteract those evil consequences so prone to follow upon her weary hours of confinement.

Never forgetting, then, that these two causes — position and undue activity of the right side — are ever exerting their prejudicial influences, when the system is weakened, and muscular power diminished — and that the brief interval, allotted to repose, is the sole period at which their insidious operations are suspended — and that even *then* position is exercising its injurious agency, as will be more clearly demonstrated, when I come to speak of the causes giving rise to lateral curvature — it



will at once be evident, that they must constitute very powerful accessories in influencing the direction of the curvature, even if they are not alone sufficient to account for the usual prominence of the right side.

Thus far facts are very clearly marked: but it should be remembered, that frequently the primary deviation of the spine occurs in the lumbar region; and as the convexity of such a curvature is usually towards the left, so is it very obvious that the dorsal one must take a direction to the right, as a necessary provision for the preservation of the centre of gravity. In such cases, it is evident that the prominence of the right shoulder is only a secondary affection: but, looking more minutely into the matter, we shall find that it is indirectly the product of those positions, that are so constantly assumed by persons who prosecute any sedentary employment; for whilst they tend to advance the right shoulder, they serve also to curve the spine at its inferior portion; and by degrees the intervertebral substance, that is placed between the lumbar vertebræ, is rendered cuneiform in shape; and thus a lateral deviation is established in this region. And we have only to believe that the majority of cases of lateral curvature do first originate at the base of the column, to cease to wonder why the dorsal inflection should so generally bear a direction towards the right; for it is most clear



that such an effect must necessarily result, when from any circumstance the lumbar portion is bent to the opposite side.

I am one of those who have been brought to believe that most curvatures do originate in the lower or lumbar portion of the column, and consequently I have no difficulty in determining why the right dorsal region should so very generally be the one to protrude, seeing that it is a natural and necessary provision for maintaining the due balance of the body. I am aware that this opinion does not accord with that generally received; but, on that account, I am not the less inclined to believe that it is correctly conceived.

Many other theories have been advanced with a view to the elucidation of this phenomenon; and, though well meriting consideration, they do not appear to be so plausible as the foregoing. The greater weight of the right arm has been urged as an important agent in the production of the peculiarity by one author\*; but, if we admit that it can exert any influence, it must be so slight as to be scarcely appreciable.

A more recent theory has been strongly advocated at the hands of one gentleman†, who believes that the determination of the curvature towards the right side is mainly dependent upon causes

\* Ward.

† Lonsdale.

operating within the thorax: thus, for instance, he holds that the greater size of the right lung, and the presence of the liver on the right side, are powerful agents in influencing the direction of the deviation, producing their effects by giving greater support to their own side of the body.

Without entering at length into the probable correctness of this theory, it is necessary only to hint at those circumstances which appear to imply its inaccuracy.

In the first place, we constantly meet with cases of lateral curvature, where the left side is the one to protrude. Are we then to suppose, that in these instances the liver and lungs do not occupy their natural and customary positions? or, that they are not of the normal size and shape? I think it would be premature to entertain such a view of the question; and we must consequently admit that a serious difficulty is offered to the adoption of this theory, from the consideration of the above circumstances. Besides, we can hardly suppose that an All-wise Creator should so have formed the perfect human frame, as to predispose it to become deformed from the very faultiness of its own conformation.

Again, the theory is inapplicable to those curvatures, which originate in the lumbar region—since it could not account for the invasion of deformity in this situation: and I know of no internal arrangement to which such a deviation of the spine should

be attributed, unless indeed it were to the support given to the left side by the presence of the spleen, which by the way must be converted into a powerful agent when engorged with blood, as it so frequently is. The pancreas, too, may not be neutral in the contention.

Such are some of the views that have been held respecting the dorsal curvature so frequently occurring towards the right side; and, I believe, that upon duly considering the plausibility of each separate supposition, we must admit, that the prevailing and most general cause giving rise to this peculiarity is that usually alleged—namely, the greater use of the right side of the body, added to the long continuance of bad and injurious attitudes.

It appears to me that an erroneous principle has generally been acted upon in the treatment of distortions, more especially of such as involve the spinal column; for it must be pretty evident, that the more debilitated the system, and the more relaxed and flaccid the structures upon which our operations are to tell, the more readily will the deformity yield to the curative agency—especially in the instance of lateral curvature: and I am decidedly of opinion, that tonics, the shower-bath, wine and other stimulants, are, as a general rule, better calculated for the after-treatment of the case—when the deflection has been essentially mitigated or totally removed—than at the outset, as is usually

advised: indeed, upon several occasions, I have derived marked benefit from putting the patient under such a course of medicine and regimen generally, as should tend, in a slight degree, to produce temporary debility. Let me not be misunderstood, however; I mean the foregoing remarks to apply especially to that class of patients who, from whatsoever cause, are still tolerably strong and muscular, and whose very strength offers an opposition to our remedial measures. It is very true, that the majority of cases coming under our notice are already sufficiently weak; but I never, on that account, despair of success—on the contrary, the case appears to me to be more hopeful from that very circumstance: and I am strongly inclined to the belief, that very few instances occur, even in this condition, in whom a highly tonic plan of treatment should not be deferred, until the principal difficulties of the deformity have been overcome.

One of the great reasons why the French method of combating lateral curvature, and such analogous affections, is so frequently attended with success, is because they commence by inducing a certain amount of physical debility, and consequent pliability of those structures, upon which their mechanical contrivances are brought to bear. Muscular strength, and a tonic condition of the ligaments must, to a certain extent, oppose the beneficial action of the means we employ to bring the spine



from the curved to the perpendicular direction, just as originally they were the principal agents in repelling the invasion of deformity. In the treatment of distortions of the limbs—arising from a rachitic condition of the bones—I always defer a recourse to a tonic plan, until I have brought the distorted bone into its natural shape, as nearly as it is possible so to do; and I then find that the use of the preparations of iron, bark, cod-liver oil, cold-bathing, and other such remedies, is most serviceable in rendering the restoration permanent.

Having made these few remarks on the subjects connected with deformities in general, I shall at once proceed to consider those involving the spine in particular—commencing with lateral curvature, because it is the most frequent, as well as the most deserving of attention; since, as I have before observed, it is more *certainly* remediable than are any of the other forms—and touching then, as briefly as is compatible with utility, upon the symptoms, causes, and effects of the disease, I shall get on, as speedily as possible, to the consideration of its judicious treatment, which is, after all, the most important feature in the enquiry; and one demanding a very careful and deliberate consideration.



## CHAPTER II.

### SECTION I.

#### LATERAL CURVATURE—ITS SYMPTOMS AND GENERAL CHARACTERS.

THIS peculiar form of spinal deviation is by far the most common, as also the one best entitled to primary consideration; since it is not, like angular curvature, almost exclusively confined to the humbler ranks of life, but its attack is usually directed against the offspring of the opulent, appearing to follow upon the very heels of excessive refinement—occurring, as it so frequently does, in the instances of those who have the most nearly-attained proficiency in the usages of modern society\*.

\* Not, however, that I am so prone to the belief, as are most writers on the subject, that it is a disease almost unknown amongst the poor; because I am in possession of incontrovertible testimony to the contrary, for both amongst the in-patients as well as the out-patients of the “Hospital for Distortions,” I am in the habit of seeing great numbers of pauper children, who suffer from this affection: moreover, I have some papers, which belonged to my late father, that afford the most corroborating evidence upon the point in question. Notwithstanding this, however, it is very certain that those who are the highest in position, are the most exposed to its invasion.

Another very cogent reason why this particular description of spinal curvature should be held as the most important, is the certainty with which it may be entirely removed—provided that the patient can get under proper treatment, before the complaint has, by a long continuance, led on to irreparable injury—a circumstance that cannot equally be alleged of the other forms of vertebral diseases. Looking, too, to the sad consequences that so surely await upon this affection, unless its progress receives a timely check, we shall all admit the good policy of placing it foremost in the ranks of those complaints that we are now about to consider.

*The Symptoms* usually attendant upon lateral curvature, are not only very numerous, but also exceedingly anomalous in their character; besides which the earlier indications of the disease either fail to strike the eyes of those unused to investigate these matters, or worse still, they are attributed to some other source than that from which they really spring: thus, for instance, it is most common to find, that the symptoms are dated only from that period when the eye had detected some morbid change in the patient's symmetry, whilst it is very evident that a variety of phenomena must have occurred prior to the advent of such a serious result.

Foremost amongst the early symptoms, that usher in the disease, are a general weakness of the

system—derangement of the digestive organs—torpidity of the bowels—a shambling and ungraceful walk—and an awkward carriage, which strongly contrasts with the light and airy step of those whose symmetry is unimpaired. I have said, that these symptoms rarely strike the observations of the majority of persons; or, even if they do, it is not to impress them with a notion that the spine is the seat of their origin—and it is perfectly true, for it is usually considered that the child is only clumsy or ungraceful; and the mama, or the governess, entertains sad fears for the creditable termination of their rigorous training.

Proceeding somewhat further in the enquiry, we find the weakness increased—the shambling paces more marked—and very soon the poor child is found to droop either forward or to one side, whilst sitting at her protracted tasks; and she requires constantly admonishing to keep herself erect. She feels a sense of weakness in the vertebral column, which is innocently supposed to arise from her obstinate perseverance in the bad habit. She may, or may not experience a dull aching wearing pain in the back—happy if she does, since it is generally the means of calling attention to the real nature of the disease from which she is suffering, whilst it is yet in a condition to be easily arrested and removed.

At a still later period more marked evidences of

the affection begin to manifest themselves. The patient is constantly desiring to recline, so as to relieve the sense of fatigue and weariness, caused by the superincumbent weight of the head and shoulders being transmitted to the pelvis in its new and highly unfavourable direction: in many instances slight shortness of breath and frequent palpitations of the heart are distressing complications of this incipient stage. The patient still is anxious to do as other children around her are doing, and she strains every effort in her attempts to vie with them in their various proceedings: she struggles, too, to maintain the erect position when sitting; but her true centre of gravity is lost, and so great is the exertion requisite to preserve this position, that the instant her attention is diverted from the point, she is found sinking to one side and falling forward.

It is generally about this stage of the attack, that all doubt as to the real origin of the symptoms, that have given her parents such uneasiness and anxiety for some time past, are at an end; for the mama, or the governess, or some other person who is constantly about her, discovers that there is a fulness of one side — generally the right — and that the right shoulder is “growing out,” as it is said.

From this period, the indications of the disease usually lead a headlong course — the projection increases in size — the right scapula is elevated.



whilst the opposite one is depressed — the spine yields more and more — the sinking and drooping to one side is constant, instead of only occasional — and she is now unable to maintain the upright position, even when making a forced effort. She constantly complains of fatigue, which is not only referred to the spine, but also to the lower limbs; and being unable to support herself with comfort, either whilst sitting or standing, she usually adopts those positions which call the least urgently upon the enfeebled muscular powers. In conjunction with these symptoms, it is very generally found that the size of the breasts differ, and that whilst the natural firmness and rotundity of the left remains unimpaired, the right becomes soft, flabby, and wrinkled: in some cases, this change in the condition of the mammæ is the first circumstance to attract attention.

When the patient is in such a condition, various means are adopted with a view of arresting the disease, as also to remove the mischief that it has already originated. For this purpose she is put into stiff stays, which are laced violently tight: she is taken to the family medical adviser, who has not much time to bestow upon it careful consideration or judicious management. By him she is recommended to try sea-air and bathing — she is destined to work hard at a prejudicial and ill-appropriated set of exercises — and, occasionally,



to recline—and is confidently told that she will grow out of it; or, at least, that it will not increase. For months the poor child is doomed to pursue this, or some similar course; the result of all of them is the same—she gets worse, and often so rapidly, that she becomes a victim to that thoughtless advice that counselled her to squander, in abortive pursuits, the most valuable period of her whole existence, before she has time to discover its hollowness and cruelty.

A longer or shorter space of time elapses before the bubble bursts, and the parents are thus convinced of the total inefficacy of the measures they have been so diligently pursuing. It breaks at last, however; and then those means, which alone can restore the child's health and figure, are anxiously sought; but frequently at so late a period, that months are required to bring about a restoration, which but a short time previously would have been both easy and certain.

When this stage of the disease has been attained, the symptoms are too obvious to require pointing out. It being only necessary to examine the spine to discover ample proof of its true and unmistakable nature, the most casual observer cannot now fail to discover the correct character of the patient's sufferings. If we examine the spine carefully, we shall find that it is not only yielding in a lateral direction; but that the vertebræ, implicated in the

deflection, have also suffered rotation upon each other, thus increasing in a great degree the outward appearance of the deformity, as well as adding a serious difficulty to the task of its removal. I attach much importance to this rotated condition of the vertebræ, for to it is mainly attributable the extreme prominence of the protruding ribs in the majority of cases; and the treatment employed for removing lateral curvature must be destined to signal failure, unless it be mainly directed against this morbid condition of the vertebral bones: and yet I have rarely found that authors have given serious attention to the subject\*. The projecting shoulder, and the protrusion of the opposite hip, are also characteristic marks of the affection—the latter deformity arising from a derangement of the true axis of the pelvis, consequent upon the lumbar vertebræ having swerved from their normal position.

The above remarks refer especially to those ordinary cases of lateral curvature, that are of such daily occurrence in the higher circles of society; other symptoms will characterize those curvatures that result from a rachitic softening of the bones, or other similar circumstances, and as these cases involve a somewhat different mode of treatment, I purpose alluding to them in a separate chapter, devoted exclusively to the consideration of the

\* The late Dr. Dod insisted very strongly upon the paramount importance of this circumstance.

“rachitic”, or “strumous” distortions. In those cases, where the persons attacked with lateral curvature are young girls who have arrived at the age of puberty, the symptoms detailed above will be generally found coexistent with a morbid condition of the catamenial discharge; indeed so intimately connected does derangement of this function appear to be with the actual condition of the existing deformity, that all our attempts to benefit this latter affection will be destined to the most signal failure, until we can succeed in bringing about a salutary change in the periodical secretion.

Such are the most prominent symptoms attendant upon the course of lateral curvature; and as the disease is one prone to increase very rapidly, so will they in many cases assume a much more urgent character than that I have endowed them with. Only a few days ago, a gentleman in one of the government offices, aged 53, consulted me on account of very distressing symptoms, that arose exclusively from a lateral curvature of a most aggravated character. In him the breathing, the digestive, and circulating functions were so deranged and impeded in their actions, as eminently to peril his safety.

I should mention before quitting this part of the enquiry, that occasionally the very young may become affected with this form of spinal disease, and still more rarely it is found to attack persons

somewhat advanced in life; but the most frequent victims of its invasion are young girls between the ages of ten and sixteen years—a circumstance that may possibly be accounted for by the fact of young persons, at this period of life, being usually much engaged in sedentary occupations—added to which, it is the time when the system is undergoing one of its most important changes, and thus it is rendered especially liable to suffer from the debility engendered by unequal muscular action, added to a long persistence in bad and prejudicial attitudes of the body.

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## SECTION II.

### CAUSES OF LATERAL CURVATURE.

As in the symptoms, so in the causes, we find a numerous and complex arrangement, since in almost every individual case we discover some essentially different phenomena to which may, in a great measure, be attributed the invasion of the attack.

The first, and predisposing cause, that gives rise to the ordinary form of the disease, is in by far the majority of instances, muscular debility—for so potent is the opposition offered to the approach of the malady, when the muscles are acting with their wonted vigour, that it is almost impossible for a curvature to establish itself, even when the person



is preeminently exposed to the most powerful influences that favour its attack. When, however, this natural defence is removed, or materially impaired, then it is that a bad position, or the undue activity of either side, joined to the injurious tendency of a sedentary life, are left unopposed to exert their most baneful influences.

The combination of several circumstances concur to produce this diminution of muscular power. Derangement of the digestive function, which so very generally awaits upon long continued bodily inactivity and great mental exertion, is amongst the foremost of the agents in its production; hence it is, that girls are so much more frequently the victims of the disease than boys, for though the latter may and do in many instances undergo as long a continuance of mental fatigue as the former, still there is one important difference between the two cases, for whilst girls are debarred from entering into any pursuit that can possibly tend to the promotion of health, boys devote their hours of recreation to really salutary pastimes, which serve as a kind of antidote to the injurious influences to which they have for many hours been exposed.

Besides the muscular debility that is consequent upon derangement of the great vital functions, simple inactivity and repose of the body engender its weakness and enfeeblement; for it is an admitted fact, that to ensure the healthy developement and nutrition of a muscle, it must be submitted to such



an amount of action, as shall be short of fatigue. This is well evidenced in the instance of persons, who, from injury or other cause, are constrained to retain their limbs in one position, and totally inactive, when a short period only will suffice to waste and debilitate the muscular fibres. Irregular or unequal muscular action is also a common cause of lateral curvature — a habit is contracted, or an occupation followed, which tends to keep in a state of activity the muscles of one side, generally the right, whilst those of the opposite are maintained in a state of comparative repose — the natural consequence is, that those, the most constantly called into action, follow the law regulating muscular developement, and become hypertrophied, and powerful, and draw the spine over to their own side — whilst those least used are so degenerated in structure, as to assume the characters of cellular rather than their natural muscular tissue. I consider this to be a circumstance highly deserving of attention, since it points to an important indication in the treatment that must be adopted with a view to bringing about the patient's recovery.

Any injury, or congenital defect, that disturbs the equal action of the legs, inducing lameness — the habit of standing upon one foot, the pinching of a tight shoe, and even the presence of a bad corn—are very frequently instrumental in inducing this form of spinal malformation; and it is a most essential

point, in making examination of a patient who is labouring under this affection, to investigate strictly the condition of the lower extremities — as by so doing we shall frequently discover the exciting cause of the disease, which, failing this examination, would most probably have remained hidden in obscurity. It is only by due attention to these trivial points that we can hope to arrive at a correct diagnosis of the disease, or of the agents necessary to its arrestation. At the beginning of the present year, a young lady was brought to me with an incipient lateral curvature, which I found to depend entirely upon a weakened condition of one of the ankles. My treatment was mainly directed to the strengthening of this part; and, in a short time, I had the gratification of witnessing the perfect restoration of her figure.

I have already stated my belief, that indulgence in a bad position, when maintained for a period of several hours daily, is fraught with danger to all persons; but more especially to such as are debilitated from illness or other cause. It is very true that the intervertebral fibro-cartilages are endowed with the highest amount of elasticity, and hence it is, that they will for a long time resist the baneful influences that are making unequal pressure upon them; but this capability of resistance does not extend beyond a certain point — a weight constantly and unevenly thrown upon them partially

destroys their resiliency—and at length they are unable to recover their uniform thickness, even when the superincumbent weight that has been pressing them down upon one side is removed. On this account it is, that those employments, such as writing, drawing, practising on the harp or even the piano-forte when unduly persevered in, are so frequently followed by a projection of the right shoulder.

The *modus operandi* of these causes needs but little explanation—the right shoulder is raised—the ribs of the same side are elevated—the spine is drawn out of the median line, whilst the head is inclined towards the left—the left ribs are depressed, and thus a slight curvature, at present only of a temporary nature, is produced, the concavity of which is towards the left side. The consequence of this condition is to produce unequal pressure upon the intervertebral cartilages—that portion of them, corresponding to the concavity of the curvature, being compressed and diminished in thickness, whilst that upon the convexity being relieved from pressure, rises up, and as a natural consequence it follows that they are rendered cuneiform in shape: and thus, by degrees, is produced a permanent lateral curvature, which is dependent upon no specific disease, nor even alteration of structure in the component parts of the spine, but which arises simply from an overtasked condition of its various structures.

We cannot have a better illustration of the effects produced upon the intervertebral substance by the influence of a weight that is constantly pressing upon them, than is presented by the familiar fact, that persons in the highest state of health are considerably shorter at night than upon first rising in the morning, manifestly because the cartilages interposed between the vertebræ have yielded beneath the weight that has been pressing them down during the time that the body has been in the erect position.

Much stress has been laid upon the ill effects of tight lacing, in predisposing to spinal curvature, and unquestionably with considerable justice; but I cannot agree in the opinions expressed by most writers, who have alluded to the subject, in believing that it can exert any specific influence, further than engendering debility. But that it does exert an indirect and most prejudicial power, may be clearly proved by considering that the habit cannot long be persevered in, without giving rise to a constricted and narrowed condition of the thoracic cavity, and consequent pressure upon the lungs and great organs of the circulation. Impeded respiration and circulation must surely await upon this altered condition of parts, the combined effects of which produce such an amount of debility and physical prostration, that the powers of resisting those agents, which actually tend to the establishment of a lateral



curvature, are materially impaired or completely annihilated.

It is not the mere effect of a belt or band passed round the hips or loins, that induces this diminution of the vital powers; but it is when the chest—the very mainspring of the human mechanism—is bound up in one immoveable mass, that such serious consequences follow. Muscular developement can only approach perfection, when the breathing is free and the circulation unfettered, for it is a recognized fact, that it bears a direct relation to the activity of these two functions—those animals being endowed with the highest muscular power, in whom the respiratory and circulating functions are the most largely provided for—thus in birds, especially in such as remain upon the wing for a lengthened period, we find the most wonderful provision for a free oxygenation and circulation of the vital fluid.

The total and complete condemnation of the use of stays, however, has led to a greater evil than that it was intended to rectify, since it has induced medical men to entertain a strong prejudice against the employment of mechanical support in the treatment of lateral and other distortions of the spine: and it is only just now that they are beginning to admit that the USE of such instruments is just as advantageous, as the ABUSE of them is dangerous and prejudicial. Those who still strongly deny their efficacy as an adjunct to other means,



are most of them such as are either contented to rely upon the opinions expressed by others, or who have never had an opportunity of judging for themselves of the real effects that are produced by them. The late Mr. Shaw, who devoted much attention to the subject, was a strong and vehement opponent to the employment of mechanical support in his earlier publications; but time, and a calm unprejudiced investigation of the matter, did for him what it fails to do for those of less enlightened minds—it brought him to the only true and correct decision—namely, that a guarded and limited use of these contrivances is fraught with advantage: and, in his latter works, he most zealously advocated this view of the question. Many still close their eyes to his sound reasoning and subsequent evidence; but this does not at all prove that the use of these mechanical apparatuses is fictitious and unfounded, it simply testifies to the faulty condition of the judgments of those who deny their efficacy.

The more obscure causes of lateral curvature, and those which produce that kind of distortion, which the most urgently demands all the attention of the surgeon, who is consulted respecting them—are such as arise from collapse of the lung, and consequent falling in of the ribs, after the evacuation of pus from the thoracic cavity. There are but comparatively few cases, however, that

originate from this cause — a fortunate circumstance, since when they do occur little can be done to relieve the patient beyond propping up the fallen side, so as to guard against the extension of the malady as effectively as possible: but the fact that some instances do occur, is sufficient to show how important it is to form a correct view of the exciting cause, from which the attack has resulted, prior to the adoption of any treatment — for how could benefit be anticipated from recourse to calisthenic or other exercises in a case originating from this latter cause? And yet there are those who never investigate these circumstances, that adopt one un-deviating plan of treatment to meet the exigencies of every case, whether it arises from a defect in the head or the heels—with what success or satisfaction to themselves and their patients is no affair of ours.

Adhesions of the pleura—the presence of a large tumor upon the side of the neck — the cicatrices produced by burns and scalds—chronic rheumatism of the intervertebral muscles—subacute inflammation of the various spinal ligaments—lumbago—sciatica—diseases of the heart or pericardium—may all, in their turn, give rise to a lateral twist of the spine, producing their effects by enforcing the maintenance of a position, that is at once subversive of the true centre of gravity, and prejudicial to the free and equal action of the various muscles connected to the spine.

As I before remarked, when speaking of the general nature of distortions, (page 18), a theory has lately been advanced to the effect, that circumstances existing within the chest exert an influence that predisposes to that kind of deformity now under consideration—thus, for instance, attention is directed to the greater size of the right lung, and the presence of the liver on the right side; but, as I there stated my doubts as to the plausibility of this theory, I need not again revert to the subject in this place.

As regards those cases, where the curvature begins in the lumbar portion of the spine—and they are equal to, if not far exceeding, those commencing elsewhere—the same train of causes are equally calculated to originate them in this situation; and I would merely add my belief, that tight lacing may exert a greater influence in giving rise to them in this than in the dorsal region—for when the whole chest and greater portion of the abdomen are bound together by such means, the spinal muscles, and those of the back generally, are entirely prevented from acting, at all events in their due and natural degree, and consequently the entire weight of the upper half of the body is thrown as a dead burden upon the lumbar portion of the spine, which being weakened from the debilitating influences of sedentary habits, rapid growth, impaired digestion, or some such cause, is incapable of resisting this

unnatural impost, and consequently it yields to one side or the other, usually towards the left—from what cause it is difficult to say, unless we were to suppose that the spleen could exert any influence in determining the direction—a circumstance at once unproved and highly improbable.

When I have repeated my conviction of the intimate relation that exists between lateral curvature of the spine and derangement of the menstrual function, in the instance of girls above the age of puberty, I think I have briefly touched upon the principal causes that give rise to the affection—almost any one of which is in itself sufficient to its production, provided it continues in operation for a lengthened period. It rarely happens, however, that any one cause exists singly—several are usually combined, and their work of destruction is expedited or delayed in proportion to the number that coexist, and the severity of the degree in which they are acting.

The curvature once established, many additional circumstances are called in to promote its augmentation—thus every position will now, unconsciously, be indulged in that materially tends to this end. If it be standing, the spine yields into its newly acquired position; if sitting, the body falls over to the drooping side, the patient finding it impossible to maintain the erect posture; and even recumbency in bed is not now exempted from an injurious



tendency, for in almost every instance, where a lateral curvature has commenced, the patient will be found to sleep with the right side of the head resting upon a high pillow—the right shoulder, the protruding one, sunk deeply in the substance of the bed—whilst the ribs of the left side are all approximated and huddled together—the left scapula is drawn down towards the crista ilii of the same side—the intervertebral cartilages are greatly and unequally compressed—and thus is a position produced, that is calculated to foster the disease in the most marked and eminent degree.

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### SECTION III.

#### LATERAL CURVATURE — ITS GENERAL EFFECTS, AND PATHOLOGICAL CHANGES.

The effects of lateral curvature of the spine are not solely confined to the mere alteration of form that occurs in those who are exposed to its insidious attack, but there are far other, and much more weighty consequences that invariably, or at least very constantly, attend its progress. To these effects it behoves us then to turn our most attentive consideration, for they are well deserving of deliberate investigation.



For the sake of perspicuity, it will be well to consider these effects under three separate heads.

First—Those which derange the outward symmetry of the body, and induce pathological changes in the structures entering into the formation of the spine, which may be termed—“The Physical,” or “Pathological.”

Secondly—Those which exert their influence upon the internal organs, or vitiate the functions performed by them—“The Functional.”

And lastly—Those which produce their impressions upon the mind and nervous system generally—“The Mental.”

*The Physical effects* of deformities in general, and lateral curvature in particular, are to disturb that perfect symmetry of the body, which is so characteristic of a well-formed person. No sooner is a deviation of this kind established, than one shoulder becomes elevated—a circumstance that is rendered more conspicuous by the protrusion of the opposite hip—and owing to the spine having swerved from the median line, thus destroying the centre of gravity, an awkward step and ungraceful carriage form a striking contrast with the light and well-measured paces of a person, whose figure is uninfluenced by any morbid change.

These striking features of the complaint are frequently augmented by the head being carried

with an inclination to one side, a circumstance that becomes necessary for the preservation of the natural equilibrium of the body. The countenance of the patient, too, gives clear evidence of the mischief that is going on; and to those accustomed to the observation of these diseases, it furnishes an appearance that cannot be mistaken. It loses the round, clear, animated expression of youth, and becomes pale and emaciated: the features assume a sharp appearance, and the eyes bespeak a sadness and dejection that has given rise to the proverbial term of "deformed face." The general bearing of the patient undergoes a change; she is no longer active and light-hearted, as are others of her age, but presents an appearance of grief and melancholy that is strikingly symptomatic of her complaint. She is easily fatigued, and incapable of making a great or long-continued exertion, and consequently avoids those pursuits that her very age would induce one to believe as particularly attractive to her. From the effects of inactivity, added to other causes, the muscles become wasted, and she speedily loses flesh, and not unfrequently is supposed to be on the brink of pulmonary consumption.

In addition to the phenomena already alluded to, considerable pain and sense of uneasiness is experienced in the neighbourhood of the curved portion of the spine, which is generally referred to some

other cause, though doubtless it arises from undue pressure upon the roots of the nerves, as they pass out from the medullary canal.

When we examine a patient thus affected we find the vertebral column presenting an appearance of curvature, the extent of which will be dependent upon a variety of circumstances—such as the length of time it has existed—the cause, or causes, from which it has originated, and the constitutional peculiarity of the patient. Generally the dorsal portion is found sweeping over towards the right side, whilst the lumbar occupies a position to the left; and, more rarely, a third twist is observable in the cervical portion, which takes a direction similar to the lower one. Besides this, a careful investigation will usually furnish clear evidence of a rotated condition of the vertebræ—a fact which I have laid much stress upon when speaking of the symptoms of the affection. The ribs of the right side bulge outwards, the spaces between them being widened—the scapula of the same side is tilted upwards, and its inferior angle is rendered particularly prominent, possibly on account of it having escaped from the embrace of the *latissimus dorsi* muscle.

In the early stage of the disease, the ribs do not suffer any positive alteration in shape; but, as it advances, their angles become considerably more acute, and in very severe cases they have even been mistaken for the spinous processes of the vertebræ.

Turning to the left side—I am of course speaking of the ordinary cases of lateral curvature, where the right shoulder is the protruding one—we find a very different condition of parts. The ribs are all depressed and flattened: they are so huddled and crowded together that they actually overlap each other, whilst their intervening spaces are obliterated; and, in advanced cases, several of the lower costæ, will be found resting upon the crest of the ileum, or even protruding into the cavity of the pelvis. Upon making the patient take a full inspiration, so as to inflate the whole thoracic cavity, we can scarcely succeed in elevating the depressed ribs, indicating the almost total inactivity of the lung, that has resulted from this long continued state of pressure. The left shoulder is sunk far below its natural level, whilst the hip of the same side is unduly elevated. Upon the convex aspect of either curve, we find an appearance of fulness and preternatural bulging, whilst upon the concavity we notice precisely the reverse—circumstances that are mainly dependent upon the rotated condition of the vertebræ.

Looking now to the pathological phenomena, observed upon making a *post mortem* examination—as well as from observing the specimens that are contained in various museums—we find that, in ordinary cases of lateral curvature, the vertebræ do not suffer any actual change in form; nor do they



necessarily alter their relative positions with regard to each other. I cannot, however, agree with a late writer upon the subject\* in believing that such a circumstance never occurs, for I have at the present time under my care a boy, aged 17, who, in addition to an extreme degree of lateral curvature, is suffering from paralysis of the lower extremities, which I can only account for by concluding that pressure is made upon the medulla spinalis, owing to slight displacement of the vertebræ involved in the curvature. It must, however, be admitted, that these cases are of very rare occurrence.

It is in the intervertebral fibro-cartilages, that we notice the most marked change. From the constant and unequal pressure that is exerted upon them, at the concavity of the curve, they become cuneiform; and are rendered so thin, that in extreme cases, the margins of the corresponding vertebræ come into actual contact with each other; and not unfrequently are found united by osseous adhesions: indeed this appears to be one of nature's provisions for arresting the progress of the disease, and it need scarcely be said, that when such a condition has supervened, all hope of cure has long gone by. It is to those patients, who have arrived at this stage, that the hopes and promises held out by illegitimate and empirical practitioners, prove the most hollow and false. The various ligaments

\* Mr. Duffin.



and muscles, situated upon the convex aspect of the curvature, having been subjected to an unnatural amount of tension, are usually found in an atrophied condition, whilst those connected to the concave side are abnormally shortened and hypertrophied; the consequence is, that the muscles of both sides must have suffered a diminution of actual force, from the cause so strongly insisted upon at the commencement of these pages — namely, a loss of that due tension, so absolutely essential to the preservation of muscular integrity.

Unless it be in such cases as originate from a rachitic condition of the osseous system, the bones of the pelvis are seldom altered in shape: and cases are sufficiently numerous to afford daily evidence that women, who suffer from the ordinary forms of lateral curvature, are not necessarily doomed to experience difficult or dangerous labours; although, it is not unusual for them to sustain troubles that are unknown to those whose conformation is perfect and natural.

It would be endless and unprofitable to attempt the description of the various alterations that occur in the form of the chest in combination with lateral curvature; suffice it to say, that the thoracic cavity is always altered in shape to a greater or less extent, and that consequently its internal capacity is diminished, and injurious pressure upon the lung is necessarily induced: hence consumption and other

pectoral diseases are of common occurrence, in conjunction with these cases of spinal deformity.

It rarely happens that the vertebral canal is interfered with; but, as a general rule, it is left smooth and continuous, as prior to the invasion of the affection.

*The Functional effects* of lateral, as of most other contortions of the spine, are less striking, but far more serious in their ultimate consequences, than those last spoken of.

It has already been said, that the thoracic cavity is altered in shape and capacity, and that pressure is thus made upon the respiratory organs, which, though slight in degree, is constant and long continued, and necessarily tends to the production of pulmonary consumption, and such analogous affections. The heart, too, is greatly pressed upon, and seriously restricted in its action, which adds additional obstruction to the circulation, already greatly impeded from the tortuosity of the great vessels consequent upon the perverted course of the spinal column.

Respiration cannot go on freely in an unnaturally shaped cavity, hence the invalid becomes short-breathed and blanched in countenance, from the imperfect oxygenation of the blood. The sympathetic nerve, with all its important ganglia, is thrust out of its usual course; and hence arises dyspepsia with its long train of evils, and that multiplicity of

nervous and hysterical symptoms, that so constantly attend upon this affection of the spine.

Examining now the functions of the abdominal viscera, we discover less serious alteration in this situation—though most commonly the respective organs are vitiated and deranged in action; thus, for instance, the digestive process is usually much interfered with, and constitutional debility is necessarily engendered. The bowels are torpid, the liver is inactive, and the function of the kidneys has even been affected, whilst the catamenial discharge is subjected to the most capricious changes.

We have only to bestow a moment's thought upon the number of organs that are situated in the thoracic and abdominal cavities—to consider the importance and complexity of the vital functions they perform—to dwell upon the extreme delicacy of their several structures—and we shall indeed find reason to wonder how an individual can support existence, who is the victim of any deformity that affects the internal calibre of their containing cavities: and it is, perhaps, one of nature's most wonderful and beautiful provisions, that she should be enabled so far to accommodate herself to this or any other morbid change, and yet leave to the afflicted individual a degree of health and vigour still sufficient to render life pleasant and attractive.

There is yet a variety of the effects produced by spinal curvature, that should properly come under

the head of "*Functional*," since they arise from a vitiated and perverted function of the nervous system—such, for instance, is that multitude of nervous and hysterical complaints, which are constantly presenting themselves to the surgeon's notice, to encroach upon his time, and possibly to baffle his skill, unless indeed his attention be drawn to the real source from which they originate, namely, the spine, when a very different result is usually arrived at. I have repeatedly had applications from young persons, who were suffering from certain anomalous symptoms, which could be traced to no very ostensible cause; and almost universally found, that remedies applied to the spine led on to an entire removal of these ambiguous phenomena.

It is not surprising that extensive derangement of the nervous system should so frequently attend upon lurking or active disease of the vertebral column, seeing how intimately the spine is connected with the great nervous centre—the encephalon.

In devoting attention to the foregoing effects, that are the products of spinal distortion, we must not forget to say a few words relative to the *mental phenomena*, that occurs in conjunction with those already mentioned; for though they are less consequential in their results they still merit attention, since a serious obstacle will be opposed to the success of remedial agents, until we can so far remove the depressing effects that are produced



upon the mind, as to instil a ray of hope into the breasts of those, who from blighted prospects, are too generally found upon the very brink of despair.

It is usual that a person of a sensitive disposition—more especially a girl who is just entering into womanhood—feels most acutely the effects of physical inferiority: and so constantly does she dwell upon this sad circumstance, that a degree of nervous debility is engendered, which greatly tends to the augmentation of her malady. Those hysterical symptoms, already alluded to, derive considerable increase from this circumstance, and in course of time we find that there is no stronger opponent to our remedial measures, than that which is produced through the medium of these mental emotions. In dealing with such a case, then, it must be our object to point out the probability of cure, if any such prospect really exists; or at least to afford as much hope as we can conscientiously anticipate, and by every justifiable means to attempt the removal of an impression, that is perilling our patient's safety, and frustrating our skill: but all recourse to promises that cannot be realized, and which must lead to bitter disappointment and regret, is a practice only fitted for those who are unmindful of their position in the profession and society at large, and one which should never be descended to by men, who work for fame rather than pecuniary remuneration.

Such is an outline of the more prominent effects



that usually accompany the invasion of lateral curvature: they may be a longer or shorter period in manifesting themselves in different cases, but supervene they will at some period—a fact that points out the necessity of seeking surgical advice the instant it is known that the spine is deranged either in shape or function, for it must be very obvious that the earlier these symptoms be parried by their appropriate remedies, the more speedy will be the relief afforded, and the surer the ultimate prospect of entire restoration. Not a year passes, in which hundreds of children are not sacrificed to the false hopes of the parents, or the promises of the medical adviser, that they will get naturally and spontaneously well.

## CHAPTER III.

### THE TREATMENT OF LATERAL CURVATURE.

WHEN a patient is brought to us suffering from lateral curvature of the spine, the primary step should be to institute a rigid examination, with a view to discover the cause from which the disease has originated; for it is only by such means, added to making ourselves acquainted with the circumstances upon which its maintenance and increase are now dependent, that we can form an accurate and unerring judgment as to the treatment necessary to arrest its progress and secure its removal; for be it remembered, that there are peculiarities connected with this, as with all other diseases, which can only be arrived at by careful investigation, and which will assuredly baffle our efforts, if we attempt to treat every case upon one general and undeviating plan, as is recommended by some: for it is by acquiring, at the outset, a clear knowledge of the previous history of the case alone, that we can ever hope to approach perfection in these matters.

The difficulty of forming a correct judgment of the immediate origin of a malady increases with

the complication of the organ or part that is affected—hence the intricate structure of the vertebral column demands the utmost care to avoid falling into serious and irretrievable error.

It unfortunately happens that cases of spinal distortion rarely come under our observation during their incipient stages, when restoration would be easy and certain; but this valuable period is generally squandered in the trial of remedies that cannot do good, but may produce serious injury: thus, for instance, the patient is advised to go to the sea-side, where she vainly awaits a recovery that can never arrive, unless those measures be adopted, which alone can bring about her restoration. Weeks and months are thus thrown away, and her case, originally simple, becomes complicated and difficult of arrestation.

A still more ruinous course, however, is very generally pursued. At the commencement of the attack, she either becomes the victim of one of the many empirics, who appear to have selected this branch of the surgical art as the arena for the exercise of their nefarious practices, or she falls into the hands of some aspiring mechanist, either of whom promise her a “*complete cure*;” and it is not until her money, or worse still her time, have been squandered, that she discovers the unprincipled chicanery of these promises: when duped and disappointed, she at length is only too glad to

seek the advice of those who can successfully and scientifically render her assistance.

Having satisfied our minds of the true cause of the attack, the next thing is to select the remedies that are indicated for its removal; and, provided these be judiciously chosen, there are but very few cases of lateral curvature, occurring prior to the cessation of growth, which may not be removed; and none but are susceptible of material benefit.

In considering the various remedial agents, much will be gained by resorting to some systematic arrangement that will prevent repetition and facilitate reference. With this view, therefore, I purpose alluding to the treatment under the following sections:

First, *The Recumbent Position* — with its adjunct, *Mechanical Extension*.

Secondly, *Muscular Exercise*.

Thirdly, *Mechanical Support*.

And lastly, *The Superadded Remedies*.

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## SECTION I.

### THE RECUMBENT POSITION.

This is amongst the oldest of the remedies that have been employed in the treatment of spinal curvature; and to its agency must mainly be attributed the numerous instances of success, that have

for so long a period, especially in various parts of the Continent, followed the treatment of those, who have selected this branch of surgery as the culminating point of their professional exertions. It is very true, that former surgeons enforced a rigid adherence to this position for a period of many months, and even years; but this was a necessity that arose from two causes. First, the want of those adjuncts, which later inventions have placed in our hands; and, secondly, from the injurious tendency of many of their remedies, which materially retarded the patient's progress; and it may be pretty confidently asserted, that those living practitioners, who still advocate this lengthened recourse to *complete* recumbency, are either unacquainted with the nature of the disease they are treating, or, at least, with the best means of insuring its removal.

Upon several occasions, the necessity of lying down has been canvassed; but never, I believe, denied until very lately, when an opinion has been launched forth expressive of its entire inutility, as an adjunct in the treatment of lateral curvature; and I can but feel that this conclusion has been arrived at prematurely, and that it only requires a somewhat longer period to convince even those who have advanced this notion, that it has been conceived in error, and nurtured in mistake.

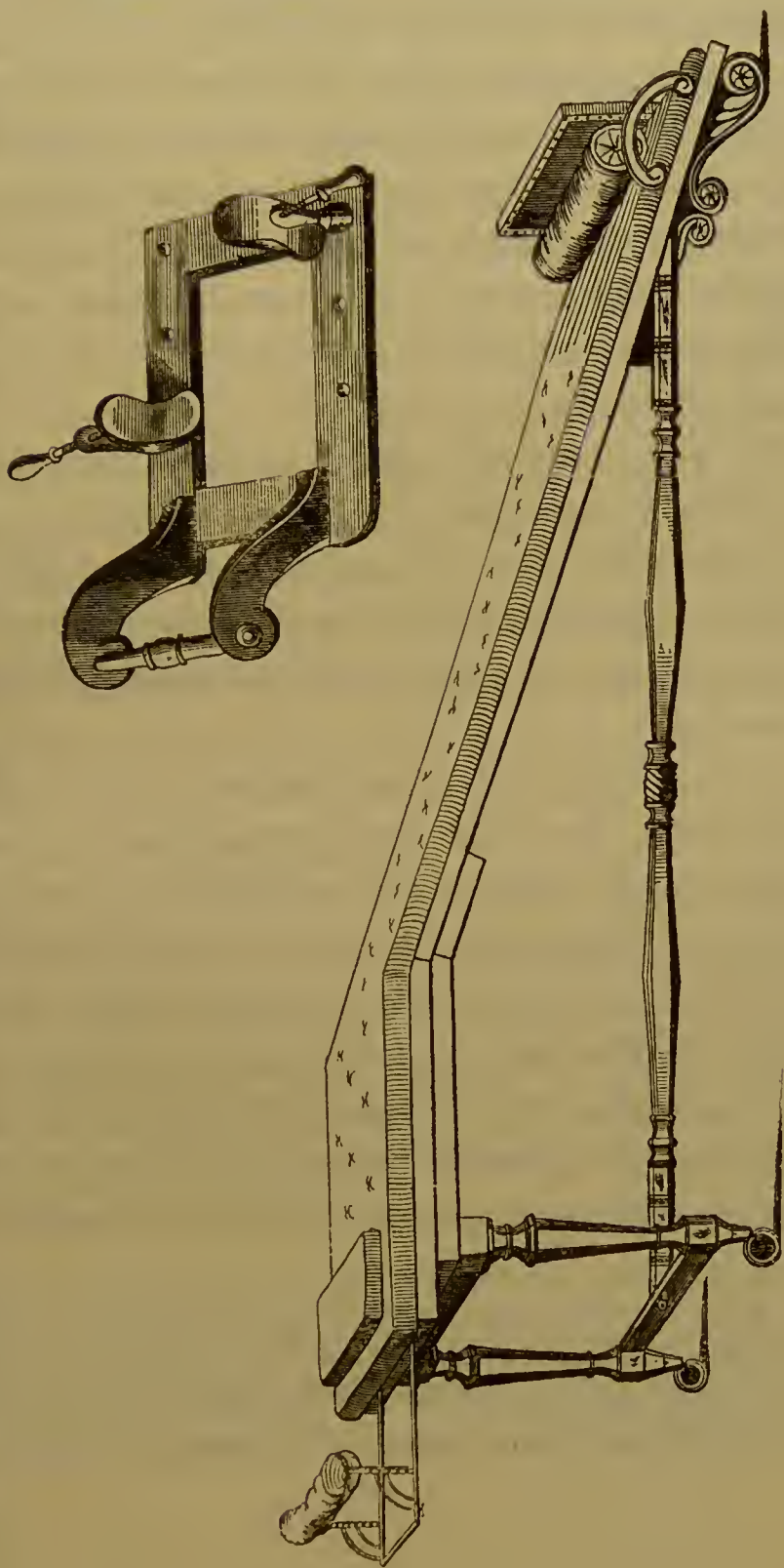
As in the case of every remedy that has been



employed for the cure of this affliction, so this also has been abused, and greatly so; still I cannot, on that account, pronounce the sweeping sentence, that it may be removed from the catalogue of remedial agents, without inflicting upon ourselves a serious and irreparable injury. What patient, with a lateral curvature of any considerable degree, that would not rather lie down than sit? or, where the one, to whom the former position would not be more salutary than the latter? Indeed, it is a species of petty tyranny to shut these poor patients up in an iron case, and tell them that they may go about their usual avocations.

In advocating the employment of recumbency, I feel great confidence when I reflect upon the immense advantage that I have derived from its instrumentality, not only in one, but in a variety of instances. I do not come forward, however, as the champion of any especial position, either "the prone"—"the supine"—or "the lateral"; for such a course I consider to be intimately connected with extreme prejudice, since nothing can be more erroneous than to adopt any one plan to the exclusion of others, especially in the treatment of a disease that so preeminently demands a variety of curative agents. Let it be accepted as a truism, therefore, that he who would successfully manage these complaints, must be prepared to do so with open eyes and unbiassed opinions.

I am in the habit of employing a couch similar to that delineated in the annexed sketch,



which I can equally adapt to either of the three positions before-named; and, in the majority of cases, I do not enjoin the unflinching use of one to the total exclusion of the other two: on the contrary, I consider that a change of posture conduces not only to the restoration of the patient's figure, but also to the preservation of her health; and it is the judicious recourse to one or the other, as its utility is indicated, that generally leads to the most beneficial results\*.

The prone and the lateral positions may, and possibly do, exert some beneficial influence upon the curvature, when not too long persevered in; whilst the supine, unaided by other means, simply retains the ground that has been gained by other treatment.

In employing the prone position, care should be taken to have the angle of the couch so arranged, as to prevent the possibility of pressure being made upon the thigh; and thus impede the freedom of circulation in the femoral vessels. The efficacy of the prone position may be enhanced, and the supine may be rendered useful, by the application of moderate pressure to the projecting shoulder, and counter-pressure upon the opposite

\* When I come to speak of caries of the spine, or angular projection, I shall refer more particularly to the prone couch, as that is the disease in which it is so preeminently serviceable. I shall then allude to its invention by my late father.

hip — effects that may be gained by the simple contrivance annexed to the engraving of the couch, (page 59). This pressure should not be of such an amount as to cause uneasiness of the part to which it is applied, for without a due regard to this circumstance we defeat our own ends; on the contrary it should be so proportioned to the patient's feelings, as to enable it to be borne for a long time, as much more will be gained from its slight application for a lengthened period, than when it is used very powerfully for only a short space of time. By reversing the position of the shields, this apparatus may be equally adapted to the prone or supine postures.

Placing the patient for an hour or so in the lateral position, with the projecting shoulder upon a belt or shield, the pelvis and lower limbs inclining below, and the head above — so as to produce lateral flexion of the spine — has been greatly lauded by some, and consequently is deserving of trial. It is a position that has found considerable favour in the eyes of some French practitioners, amongst whom are MM. Guerin and Pravazz; but perhaps its greatest advocate was Dr. Louis Stromeyer, of Hanover, who in a work called — “*Ueber Paralyse der Inspirations Muskeln*,” bestows upon it the most extravagant praise. Mr. Lonsdale has recently adopted it, and has written a useful treatise upon lateral curvature, in which he strongly advocates its employment —



whether or not it has as yet been sufficiently used to justify this praise, is no subject for discussion in this place. As regards my own experience, I can only say that I have very frequently had recourse to it both in the form originally proposed by him—as also through the medium of a shoulder-plate, which I attach to the upper part of the prone couch—and the opinion I have arrived at, from carefully watching its effects, is, that in some cases it may produce slight benefit, but that in others it is totally unsuited to the treatment of lateral curvature, owing to its tendency to aggravate the lumbar curve, as well as the cervical, when this latter exists: whenever it is used, it should be guardedly superintended, from the very circumstance that it is often prone to produce greater evils than those it is expected to palliate.

*Mechanical Extension* is of eminent service, where its employment is not forbidden by the presence of pain, or any inflammatory symptoms. It is the most readily and beneficially employed, whilst the patient is lying in the prone position; because friction, and other manipulations to the back, may then be used to increase its efficacious tendency. A simple belt passed round the patient's loins, with cords descending from it to the foot of the couch, to be attached to a small pulley-wheel, whilst the arms are extended forwards by means of a cross-rail, that is attached to the apparatus employed for producing lateral pressure (vide page 59), to which



also may be attached a cord and a well-padded leathern strap, which, being fixed to the head, enables us to draw directly upon the spine through the medium of the ligamentum nuchæ—surely I need not say that this latter action must be carefully exercised—indeed it should never be employed, saving under the immediate direction of the surgeon.

As in the instance of pressure and counter-pressure, mechanical extension should be moderately applied, and long continued—at least for two or three hours daily—inasmuch as its most beneficial influence is not obtained, until, by fatigue, the muscles cease to oppose the extending medium, and thus its action is brought to bear upon the shortened spinal ligaments.

When slight extension is applied to the head and neck, it should be made to act more directly upon the occiput than upon the chin, as is usually the case—care must always be taken to release the patient, when she complains of pain, or considerable fatigue; and the action should be renewed as frequently as is compatible with her powers of endurance.

I entirely disapprove of the patient's being put under the influence of any amount of extension during the hours allotted to repose, as such a course tends to induce a degree of muscular debility and fatigue highly prejudicial to the patient's recovery.

In advocating the employment of mechanical extension, however, let me emphatically record my dissent from the opinion entertained upon the subject by the late Dr. Edward Harrison. With a most zealous enthusiasm, that gentleman indulged in certain kneading, hammering, pushing processes, in combination with violent stretching of the spine, by which means he fancied that he could reduce vertebræ, which it is needless to say were never dislocated, or even "semiluxated;" and doubtless incalculable injury has arisen from putting such a plan into execution, more especially in the instance of caries of the spine, and its sequel angular projection, for which complaints, however, it was very strongly recommended.

As far as the doctor himself went, the practice was just pardonable, inasmuch as he was an enthusiast, who honestly believed in the soundness of the system he advocated; but, alas! it is much to be regretted, that those should still be found, who, without the excuse of his zeal, are equally ready to come forward and avow themselves his imitators, in the face, too, of anatomical considerations that must be very difficult to get over.

Neither is the extension, employed by me, to be classed with that obtained through the medium of those terrific engines, that have at various times been used for the purpose upon many parts of the Continent. I know of nothing more frightful than

the contemplation of the possible contingencies that might arise from the application of such machines as those used and recommended by Messieurs Heine, Milli, Humbert, Maisonabbe, Lafond, Duval, &c.; all of which are worthy of a place in the general catalogue of treatment that has been advocated by some of those gentlemen—such are “slight flagellations;” exposing the “bosse” to the influence of steam (*de vapeur aqueuse*), it being “*masse et pétrit en même temps.*” Be it remembered that I stop infinitely short of this extreme, which nearly approaches the precepts laid down by that enlightened surgeon of olden times, Ambrose Parée.

Perhaps I cannot bring this portion of my subject to an end better, than by stating that it appears to me, that the opinion of the late Mr. Shaw (whose work upon “The Defects in the form of the Spine, Chest, and Shoulders,” is most moderately and temperately written) is best in accordance with a sound and scientific principle. That gentleman, after vehemently declaiming against the barbarous system of extension, employed at the “Convent of Sacré Cœur,” and at various other institutions in Paris, goes on to describe an apparatus of his own invention, by means of which the spine could be guardedly drawn upon, and thus induced to resume its natural position.

In cases of lateral curvature, where the disease

is far advanced, the various ligaments placed upon the concave aspect of the arch are in a shortened condition; and, with a view of restoring them to their normal degree of length, moderate extension is not only admissible, but positively indispensable.

As it is of great importance to preserve during the night the ground that has been gained in the course of the day—a point that has been much neglected—I generally place the patient in the prone or supine position, giving her the choice—with the lateral shields so applied as to avoid the possibility of her assuming an injurious posture whilst sleeping. It is unnecessary to attempt to gain improvement during the night—the day being quite long enough for that purpose, provided good use be made of it, and we take precaution not to lose ground, during the hours of repose.

I cannot but consider that the patient's comfort, as well as her health, must be sacrificed to the injudicious practice that is recommended by some, who advise sleeping in a rigid metallic instrument—a precaution that is not only quite unnecessary, but positively injurious; and I believe that a little consideration on the part of parents would lead them to pause before they consented to submit their offspring to so severe a practice, for it can but be evident that serious consequences must, sooner or later, attend such a course.

If, as says the celebrated physician and philo-



sopher Locke—"whalebone stays often make the chest narrow, and the back crooked; the breath becomes fetid, and consumption probably follows"—how is it that any one is found to escape these dreadful consequences? One single circumstance explains the mystery—the stays are cast aside at night, and the vital powers are thus enabled to rally from the injury they have suffered during the day. There are but very few women, who encase themselves in these artificial supports, who could attain even middle age, were it not for this one fortunate circumstance. Attention to such a fact must work its own beneficial admonitions, and it cannot fail to render the idea of young persons being imprisoned in any kind of machine, not only during the day, but also at night, most revolting to the minds of parents as well as to the majority of the medical profession.

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## SECTION II.

### MUSCULAR EXERCISE.

*Muscular Exercise*, when employed with discretion, and cautiously superintended, is, perhaps, the most important adjunct in the whole catalogue of remedies. It has for a long time held a high



place in the estimation of those who have especially devoted their attention to this subject, and innumerable instances have been cited to prove its competency to produce restoration, even when unaided by other means: and no doubt it has been persevered in under this notion to a most injurious degree; but this was its abuse, and not its use.

So beneficial is the auxiliary power of muscular exercise in those cases of lateral curvature, which originate from debility of the system, that even the ill-selected and inappropriate forms that were formerly in use, were frequently attended with good results—many cases of a slight nature having been mainly cured through their instrumentality, while those of a more severe degree were greatly benefited. What was formerly, however, a mere matter of chance has now been brought to such a state of perfection, that the effects of muscular exercise may be as confidently predicted, as can the operation of any other remedial agents; and whilst, too, any evil consequences, that have been known to arise from its employment, are entirely removed, owing to the progress that has been made in the estimation of its real effects.

The variety of useful and agreeable exercises that may be contained within one small apparatus, and the beneficial influences that they are capable of exerting—not only in those who suffer from lateral curvature of the spine, but also in such as are

afflicted with local or general debility—is perfectly astonishing. Swimming, rowing, vaulting, climbing, and many others may be imitated to the greatest nicety—each of which is capable, in a limited degree, of exerting as much benefit as is the actual indulgence in those healthful pastimes.

The great advantage of exercise, in the treatment of lateral curvature, is perfectly familiar to the French practitioners, who, until very recently, were a long way in advance of us in this particular branch of surgery. In the “Institut Orthopédique de Chaillot,” which is superintended by M. Bouvier, and where I passed much time when resident in Paris, there are numerous ingenious contrivances for putting this plan of treatment into execution; and in the writings of M. Bouvier, I find the following remark, which is so pertinent to the subject, that I need hardly apologize for extracting it.

“Un exercice régulier, actif, mesuré d’après l’état des forces et approprié au genre de difformité, sont les principaux élémens de ce traitement médical et hygiénique.”

“De nombreux appareils gymnastiques fournissent une grande variété d’exercices musculaires, qui, pratiquées avec choix et méthode, sous la direction immédiate du chef de l’Etablissement, ne contribuent pas seulement à faire disparaître la difformité, mais en préviennent encore le retour, en modifiant avantageusement l’état général des forces,

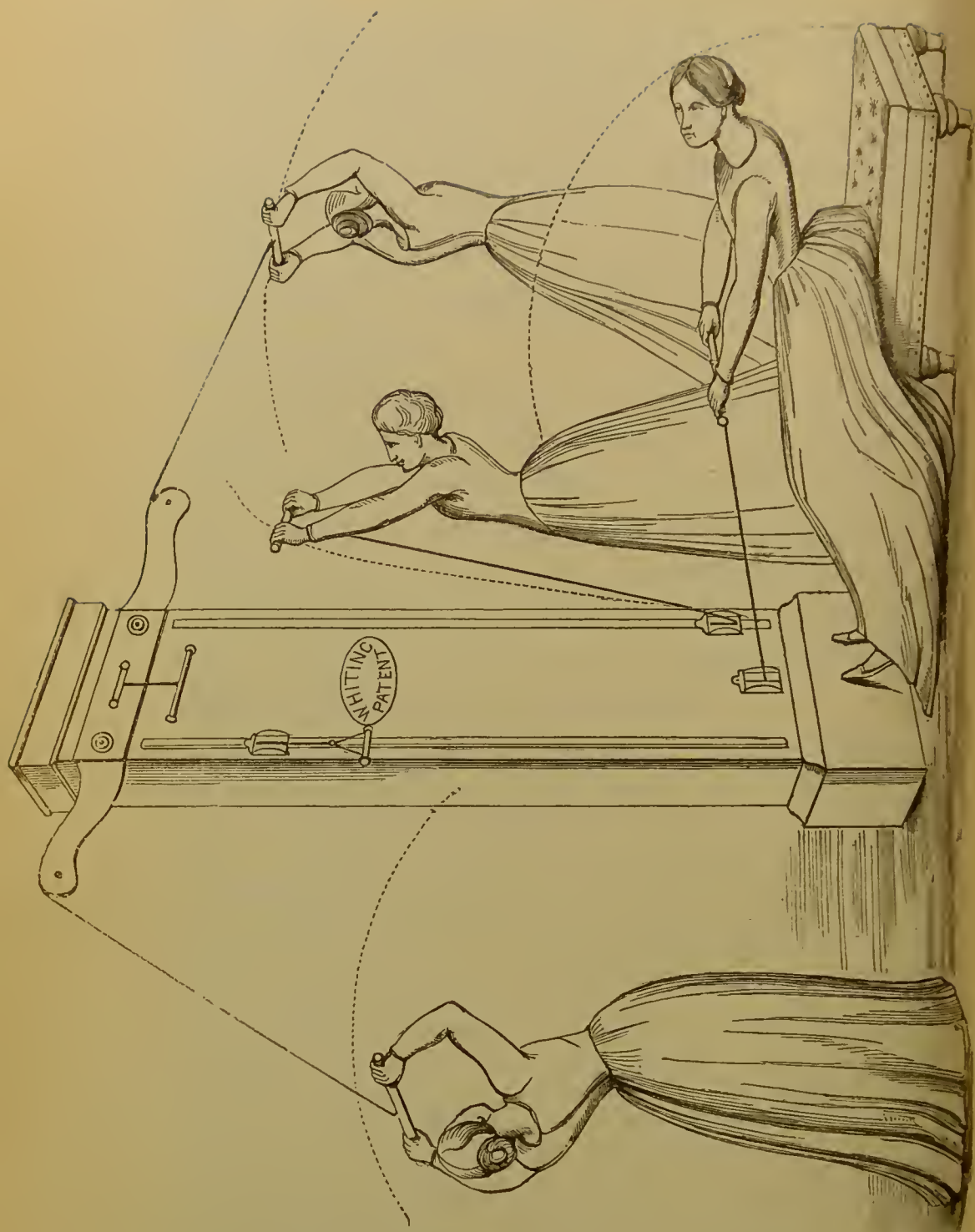
en redonnant de l'énergie aux muscles, et en rétablissant l'équilibre de leur action."

I am not, however, about to write a treatise on the general advantages of muscular exercise, though I could with infinite pleasure engage in that task; but I must here confine myself simply to its utility as connected with the treatment of lateral curvature.

In almost every case of this affection, which is dependent upon the ordinary causes, the employment of gymnastic exercises is fraught with advantage, whilst, in very many, a cure could not be perfected without having recourse to them. I have, at the present time, a little boy under my care, who is rapidly recovering his symmetry by an almost exclusive use of these agents.

The knowledge of the immense advantages derivable from their employment in the particular cases now under consideration, has been the means of engaging the attention of scientific men for a long period of time. On many parts of the Continent they form the basis of the treatment, and some eminent authorities advocate their almost exclusive use. The necessary result of this has been the construction of certain ponderous machines for obtaining the desired end, many of which, though possessing the seeds of useful actions, have entirely defeated their own intentions by the very complication and clumsiness of their mecha-







nism. Latterly, however, much improvement has taken place in these particulars; and inasmuch as simplicity is generally a proof of excellence, so the simile holds good in this especial case.

The most ingenious and complete apparatus for procuring a variety of movements, which I have as yet had an opportunity of witnessing, has been invented, and is manufactured by a very clever mechanist whom I employ, Mr. Whiting, of the New Road. The annexed sketch will afford a general idea of the nature of this cleverly conceived machine; but so various are the movements of which it is susceptible, and so difficult is their detailed description, that I cannot, in this place, undertake to enter upon their full consideration: a very general allusion to them must here suffice; and I must request those who may wish to pursue the subject further, to grant me but a brief interval, during which I purpose to bring out a small pamphlet upon the general advantages of muscular exercise in the treatment of deformities and other diseases, and which will contain a detailed description of Mr. Whiting's ingenious apparatus.

With these remarks I may briefly state, that flexion and extension—lateral motion, either oblique or parallel—rowing—climbing—swinging—vaulting—stepping—swimming, and several other modifications of exercise—may be procured through the medium of the simple contrivance delineated in the annexed engraving.

Of course it would be manifestly injudicious to submit the patient to every one of the above-named exercises—it is the surgeon's province to select such of them, as are particularly indicated in each individual case: sometimes, for instance, the exclusive use of one arm is advisable, whilst at others both should be equally employed; occasionally an oblique action should be persevered in, and then a direct or parallel one—circumstances that can only be regulated by the position of the curvature, and the effect they are found to produce upon it, as well as upon the muscles connected to the vertebral column. No general rule can be laid down to guide us to the selection of those which are preeminently serviceable, as it will be found that two cases, of very similar appearance, will require almost opposite actions to bring about an improvement in the figure. Much time and vigilance are demanded at the hands of the surgeon, who undertakes the superintendence of the requisite exercises, for it is upon his discretionary judgment that will depend the success or failure of the treatment adopted.

Whilst employing exercises, the patient should stand upon an even surface, with the heels close together and the toes everted; and the period of continuing them should be strictly proportioned to her physical powers—always ceasing when much fatigue is induced, but returning to the employment of them twice or thrice daily according to circumstances.

Partial exercises may be used, whilst the patient is in the recumbent position—especially the prone—and much benefit may be anticipated from such a course, since they may be continued for a lengthened period without producing exhaustion. I attach much importance to these local or partial exercises, especially in those cases of debility, where extreme prostration follow even slight exertion in the erect position.

An attempt has recently been made to decry the utility of special exercises as an adjunct to other treatment of lateral curvature, possibly on account of the great tax they impose upon the time of those who are no lovers of this species of employment; but notwithstanding the temporary evils that this ill-judged advice is calculated to produce, time and careful investigation must ultimately assert their paramount importance; for, from their use, we derive advantages which nothing can replace—a fact that must already be, or will ultimately become apparent, even to the minds of those who would substitute in their stead an iron case for the perpetual imprisonment of the body, under the idea that they are introducing an improvement. However any thing is good for a novelty; and I can readily understand that the unremitting attention, which is required for procuring the advantages that muscular exercise is capable of affording, should be highly distasteful to

those who would willingly dispense with them, and who have consequently attempted to impugn their utility: but I cannot comprehend, that men, who have given to the subject that calm consideration, which its importance so eminently demands, should have arrived at a conclusion at once opposed to common sense and popular belief.

Amongst the most important advantages, that attend their well-directed employment, may be mentioned—the beneficial influence they exert in fortifying and preserving the patient's health during a long and necessary period of confinement—they increase and promote the power of the respiratory organs—they induce a free and active circulation of the blood, without which health cannot be preserved—they facilitate digestion, relieve the torpid condition of the bowels, expand the chest, and keep up animal heat—they materially influence the state of the catamenial discharge, frequently producing the most salutary change in this particular—they impart to the patient's spirits a lightness and buoyancy to which she has been long estranged—and they give to the countenance a lively hue and mirthful expression, that strongly contrasts with the prematurely old appearance, that is so characteristic a feature of persons who suffer from spinal deformity. Beyond this, they increase and promote muscular developement, and improve the general tone of the system—and, by so selecting



them that their actions shall be brought to bear upon the series of vertebral joints, they produce an elasticity and pliability of the column, that not only facilitates, but is absolutely essential to recovery.

It need hardly be mentioned that a system of exercises should be gradually commenced and cautiously increased, both in activity and the period of their employment; and they should even be continued for some considerable period after restoration has supervened.

I will not longer dwell upon this important and interesting subject, but proceed at once to the consideration of the next adjunct to the treatment — namely, mechanical support.

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### SECTION III.

#### MECHANICAL SUPPORT.

The use of *Mechanical Support*, as an aid to the cure of lateral curvature of the spine, has been equally the theme of the warmest applause and the most violent tirade at the hands of various medical men, a circumstance that can only be accounted for by the peculiar description of instruments and the mode of their application, which has been employed by the various authorities on



the subject. Those who have abused their agency, can only have witnessed or heard of the frightful consequences that have followed the use of such dangerous and terrific machines, as have been constructed at the hands of those, alike strangers to the anatomical conformation of the body, and the nature of the diseases they professed to treat; whilst the warmest advocates of the principle of mechanical support, have very often been enthusiasts, whose zeal led them into the wildest excesses.

In the majority of the works of old authors, as in very many of those of the present day, pictures are given of these huge engines; and the advance of education has not yet succeeded in entirely banishing either the instruments, or those who come forward as the champions of their cause.

In several establishments abroad, both of a public and a private nature, I have had the opportunity of seeing patients, who have been barbarously submitted to their powerful and injurious influence; and I am only astonished, that so many of them could continue to exist under their baneful and long continued use. Continental feelings, however, do not appear to be quite so sensitive upon these points as are those of Englishmen, and consequently we must allow a longer time for producing in their minds a feeling that is rapidly gaining ground in this country, especially amongst

the fairer portion of its inhabitants, who now rebel against the idea of being encased in these huge cuirasses.

Discarding, then, even an allusion to these hideous contrivances, we will proceed to consider the advantages that are afforded by the improved instruments of the present day, generally; and of one of my own invention, in particular.

I am anxious, however, to preface these remarks by stating my belief, that any benefit, which may result from the use of mechanical support, will be entirely counteracted, if worn beyond a certain period—they are simply useful as adjuncts to other measures, and should be resorted to only at stated times. If, on the contrary, their application is persisted in, not merely during the entire day, but even at night, as has lately been advised, then will they not only fail to produce benefit, but will also give rise to serious and irremediable injury. Let me, therefore, request the members of my own profession, as well as the parents of such as may require their assistance, to be on their guard against any advice that counsels them to trust to mechanical support alone for the cure of spinal deformities; for it is not only the disappointment consequent upon such a course that demands attention, but the actual injury that is occasioned by these instruments, when constantly worn, is of very primary importance.

I think that I am quite justified in stating that the era of improvement in the principle, construction, and application of mechanical contrivances for the relief, and partial cure, of lateral curvature of the spine, should be dated from the period when Mr. Tamplin first introduced to the notice of the profession his cleverly conceived instrument. This gentleman was speedily followed by Mr. Lonsdale, who having had the opportunity of witnessing the effects produced by the invention of his colleague, himself proposed a modification of that apparatus, which he considered to possess certain points of superiority; and, doubtless, it was calculated to meet difficulties that the other was inadequate to contend against.

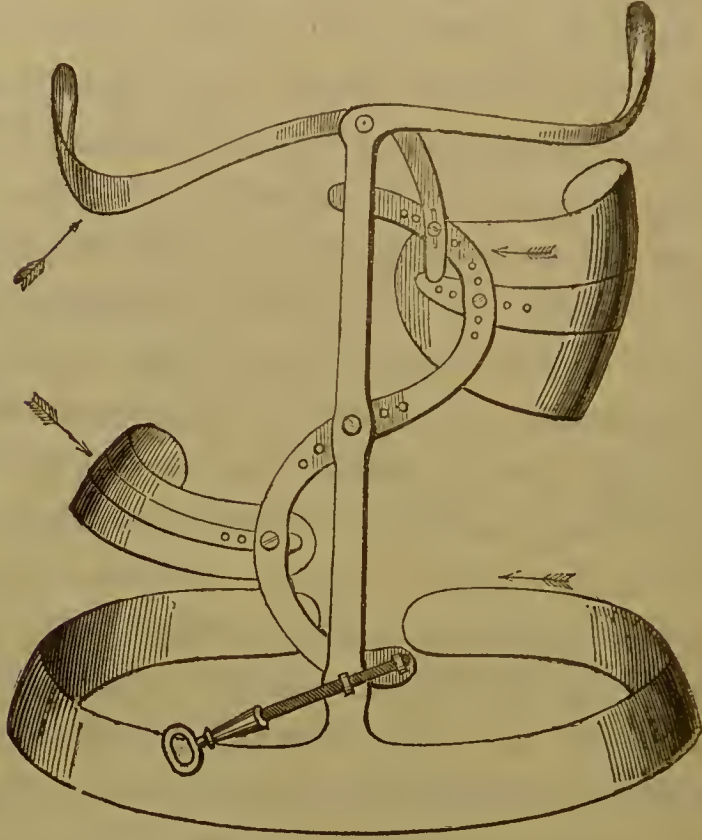
I have already stated my intention to avoid entering upon a critical analysis of the theories or plans of treatment practised and advocated by other writers, and for that reason I refrain from discussing the relative or positive merits of either of the instruments recommended by the two gentlemen above alluded to: again, therefore, attributing to them the merit of first opening a superior track in this important matter, I will simply state my own conviction, that the instruments alluded to are still unequal to the production of much benefit in cases of lateral curvature—at least, where the disease has assumed any considerable degree—indeed it was from the fact of having noticed their

incompetency to overcome certain peculiarities and difficulties in various instances, that I applied myself, with much earnestness, to the task of discovering some means that should more speedily and effectually enable me to contend against and overcome these difficult points. I am particularly anxious to impress upon the reader's attention, however, that I do not for one moment call into question the results that the two gentlemen above-mentioned assert to have awaited upon the employment of their own contrivances; I would simply record my belief, that there may yet be discovered instruments, which not only will be found more beneficial, more effectual, and more perfect, but which also will be much simpler, and less endowed with an injurious tendency than are those which make upon the pelvis, especially upon that portion of it formed by the sacrum, such an amount of pressure as must materially alter its shape, and thereby seriously interfere with the important process of parturition.

The result of my own reflection and meditation has been the invention of the instrument delineated in the succeeding page; and from studying the mechanical principle upon which it is constructed, and on which its action depends, as well as by having witnessed its great efficacy in the alleviation of some very severe cases, I have little scruple in asserting my belief, that it will be found to be the most efficient, the most useful, and the most power-



ful, with the least evil tendency, of any mechanical apparatus that has yet been proposed for the relief of a lateral deflection of the spinal column.



The important advantages possessed by this contrivance may be thus briefly described.

The object of all mechanical instruments, that are employed for the palliation or cure of lateral curvature of the spine, must most certainly be frustrated, unless their construction be so arranged, as to avoid making pressure upon any important part, more especially upon the thoracic cavity; in fact, it may be laid down as a rule, that any appa-



ratus, which is not strictly subservient to this fundamental principle, is dangerous and prejudicial to the well-being, and possibly to the actual existence of the patient.

Admitting this fact, a moment's glance at the instrument I am about to describe will serve to convince, even the most incredulous, how admirably it is adapted to fulfil this most important condition; for, whilst its action upon the curved portion of the spine is most powerful—whilst it elevates the depressed shoulder—and whilst, too, it gives to the debilitated structures, that are inadequate to maintain the perpendicularity of the vertebral column, the most perfect and complete support, its mechanism is so simple, its points of pressure so few and comparatively unimportant, and its efficient action so provided for, that the chest, the abdomen, and indeed the majority of the muscles of the back, are left to act with their own natural and perfect freedom, being completely exempted from all pressure or restraint.

Were these the *only* advantages that pertained to this efficacious apparatus, still should I feel justified in putting it forth as the best contrivance that has yet been proposed for the treatment of the affection now under discussion; but when I remember that there are other and equally weighty considerations and difficulties, which it is adequate to meet and overcome, I cannot help feeling that it must

ultimately obtain a high position in the estimation of the profession, and the approbation of the public.

In order the more fully to demonstrate the advantages of which I have spoken, it will be necessary to enter into a brief description of its mode of action.

Any one, who has made a careful examination of a patient suffering from lateral curvature, cannot fail to have observed, that it is possible to bring the spine almost, or entirely, into its natural and erect line, by making pressure upon three points; that is to say, if he places his left hand under the patient's left arm-pit, and elevates the shoulder, and gets an assistant to press upon the convexity of the lumbar deflection, whilst he, with his right hand, exerts pressure upon the projecting ribs of the right side, and through them upon the dorsal curvature, in by far the majority of cases the deformity is so reduced, as to be rendered scarcely, if at all perceptible.

It was from the knowledge of this circumstance, and from the important lesson it taught me, that I applied myself for a lengthened period to the task of discovering some mechanical contrivance, that should accurately imitate the action of the three hands thus applied, being at the same time equally exempted from an injurious tendency, as are they: and I hope to demonstrate, in the sequel, that I have not entirely failed in my endeavours to carry this principle into practice.

In all the instruments that I had seen, prior to the first application of the one I am now describing—and I have made it a very imperative duty to examine the mode of action of, and effects produced by, the majority of those that have as yet been recommended, before I ventured to call into question their efficiency, or attempted to improve upon them—I could not find a single one that did not possess two striking points of failure, points which must almost have annihilated any beneficial tendency that they may have been supposed to possess.

The first of these failings—and it was strikingly evident even in the very best of the instruments that I examined—was an uncontrollable disposition to tilt to one side: no matter how accurately the pelvic portion fitted, or the crutch was adjusted, the fact was always the same, the moment the screw was made to travel sufficiently to bring the shield into powerful contact with the projecting ribs—down went the pelvic hoop to one side, and the instrument was rendered paralysed and powerless.

The second circumstance, that occasioned the uselessness, or I should say the positively evil effects of former instruments, was, that the crutch for supporting the left shoulder was attached to a long stem or shaft, which descended perpendicularly to the pelvic hoop, or to some portion of the

apparatus, so as to transmit the weight of the shoulder to the side of the pelvis\*. Now three evils resulted from this mode of proceeding. In the first place, the tendency of the instrument to tilt was very materially increased. Secondly; unless the shaft of the crutch was particularly clumsy and rigid, it yielded beneath the superincumbent weight, and thus was rendered particularly liable to make most injurious pressure upon the left side of the thoracic cavity, where already so serious an amount of pressure existed, as to predispose the patient to some severe pectoral disease. Thirdly,—and though a very trivial point in comparison with the two foregoing, yet not entirely devoid of importance when it is considered who are the class of patients for which such contrivances are required—it imparted to the patient's figure an awkward and unsightly appearance, preventing the dress from fitting closely, causing the side to bulge outwards, and otherwise deranging her symmetry.

Having briefly stated the principal grounds upon which the inefficiency of former mechanical supports depended, and having, I trust, proved enough to justify my attempting to remedy these inefficien-

\* Mr. Lonsdale saw the evil of this practice, and in his instrument has attempted to obviate it; but I am not sure that he has succeeded so perfectly as would be imagined by a perusal of his work on the subject.



cies, I will at once proceed to the description of the apparatus that I am now employing in the Hospital, and amongst private patients, with the most gratifying and pleasing success.

I do not purpose to enter into a minute description of the structure of the instrument, since it does not appear to me that it belongs to the surgeon's province to do so; nor, indeed, do I consider that any benefit could arise from such a method of procedure: I will therefore at once commence with its mode of application.

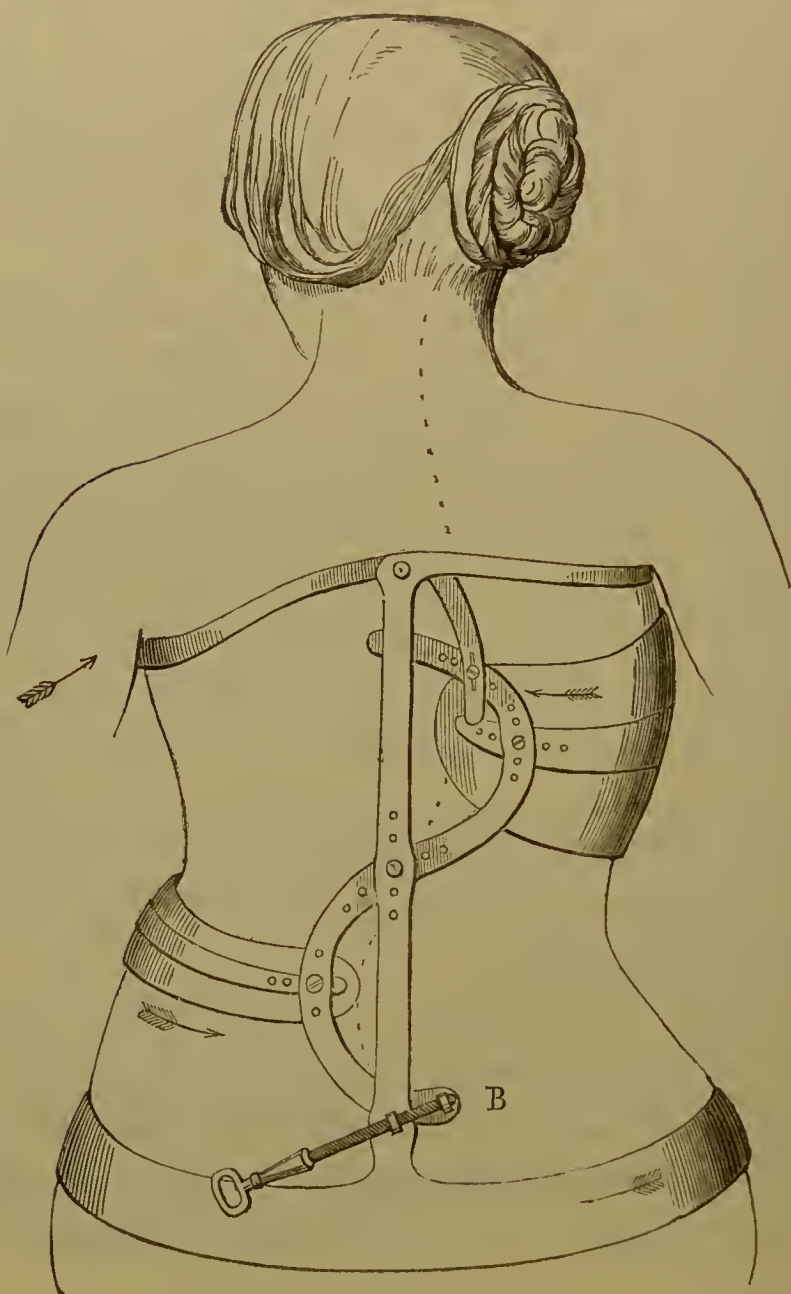
When the instrument is being put on, care should be taken to get the pelvic hoop, which is made of steel, covered with leather, and evenly padded, to fit accurately: the clothing, over which it is worn, should not be in wrinkles or folds, and it should be of equal thickness all round. Having secured the hoop, the crutches should be placed beneath the arms, and fixed in their places by means of the small leathern straps indicated in the engraving of the apparatus (page 80). The shields should now be adjusted, getting that of either side to act upon the most convex part of the corresponding curvatures.

When the instrument is applied, the screw should be gently turned, until such an amount of pressure is produced through the medium of the shields, as may be sufficient for the particular case under treatment. One of the great advantages of



the instrument is, that its power may be regulated to the most minute degree.

If the reader will now direct his attention to the annexed engraving; and just imagine the lower extremity of the lever bar (B), moving in a direction



from left to right, it will at once become most evident, that the action of the three hands before alluded to is accurately imitated; and that the three essential points of pressure are effectually procured; for whilst the sigmoid shape of the lever bar produces through the medium of the shields pressure upon the convexity of the dorsal and lumbar curvatures, so also does it at the same time serve to elevate the depressed shoulder, and thus by the action of the one single screw, the three effects are simultaneously obtained.

Since I have claimed for my invention a certain amount of superiority and improvement, it behoves me to explain the peculiarities upon which I consider its higher merits to depend; and I trust to be enabled to show, that I have not arrogated to myself a position which I am not able to defend.

First, then, I have lopped off the offending crutch, which must so often have produced the most incalculable mischief, substituting for it a light and simple contrivance, which can be so regulated, as to elevate or depress the shoulder at pleasure; at the same time procuring for the sunken or depressed left side (I speak of course of ordinary cases) an entire exemption from pressure, thus leaving it unimpeded, or uncompressed, to regain its wonted symmetry and form, allowing the lung to resume its natural and healthy function.

In the second place, I have substituted for a straight lever bar, one of a sigmoid shape, which, in addition to being infinitely more powerful, is also more compact, and exerts a decided influence in obviating the disposition of the instrument to tilt, or become displaced.

Thirdly, I have added a crutch to the right shoulder, by means of which, assisted by that of the opposite side, a very serious contingency is guarded against, and one for which I have found no provision in the instruments recommended by other writers; namely, that in stooping forwards, the apparatus follows the patient, keeping closely and accurately applied to her figure, instead of permitting her to get away from it, as does every other contrivance I have yet seen.

Fourthly, instead of employing only a single pad or shield to the projection in the dorsal region, which I found perfectly inadequate to effect any material degree of benefit in severe cases, I have fixed to the sigmoid bar an additional shield for the removal of the lumbar deflection—a most essential point in two ways—first, it assists in preventing the instrument from tilting, being so effectual in this particular, that in no single instance in which I have used the apparatus, have I been able to discover the slightest unevenness in the position of the pelvic hoop. Secondly, it materially assists in straightening the spine, which could never re-

gain its perpendicularity, unless measures were adopted for unbending this lumbar curvature.

Lastly, it applies itself so closely to the figure, that even a practised eye can scarcely succeed in discovering its presence—a point not altogether without advantage.

When I have said all this, and added that it is extremely light, that it gives so much support to the patient, that the majority of them are unwilling to have it removed; that it improves the aspect of the patient's figure; and that it enables her to engage in amusing and healthful recreations, whilst her cure is steadily progressing; and when I repeat—for this is a most important point—that the whole contents of the thoracic and abdominal cavities are unexposed to the slightest degree of pressure, then surely I may feel that I am justified in having attributed to this instrument many and valuable points of superiority.

Having, I trust, sufficiently detailed the principle and mode of action of the apparatus, it remains to enquire when, and for how long a period, it should be worn; and what results may reasonably be anticipated to await upon its occasional and guarded use.

I have already condemned the employment of mechanical supports beyond a certain period during the day—endeavouring at the same time to point out the imminent danger that is incurred, by having



recourse to them at all during the hours allotted to repose; it is, therefore, quite unnecessary further to insist upon these points—I will dispose of them then, in this place, by stating that my objections and antipathy to such a practice, are not founded upon any speculative or vague theory; but, on the contrary, I express my opinion, because I have repeatedly witnessed the most disastrous results attend upon a system equally cruel and unnecessary.

Admitting, then, that the instrument should only be employed occasionally, let us enquire when it should be worn, and for how long a period.

Upon no occasion, have I found that I gained any advantage from the application of mechanical contrivances, when used for more than five or six hours daily; indeed, about six hours should be fixed as the maximum period for which they can be advantageously worn, any time beyond this serving only to debilitate the patient, and give rise to a dangerous amount of bodily prostration; moreover, I think that such a time will be quite sufficient to enable the patient to engage in an ample amount of exercise and recreation for keeping her in strong and vigorous bodily health; and at all other times she will be deriving infinitely more benefit, from the employment of gymnastic exercises, or lying in the prone or supine position.

The best times of the day for devoting to the



use of the instrument, are the morning and evening; thus, for instance, supposing that a vigorous system of exercises have been engaged in until eleven o'clock, A. M., the patient should then lie down, in order to recover from the fatigue that has been induced by her morning's avocations: and, having rested, say, an hour, at twelve o'clock the apparatus should be applied, until two P. M.—exercise in the open air being taken during the whole time that it is worn, if possible. At two, she should return, and having the instrument removed should take her dinner in the recumbent posture.

The afternoon should again be devoted to exercise, friction, and other manipulations, together with the employment of the instrument for two hours, until tea-time, which meal should also be taken in the recumbent position, perhaps the prone is the best. After tea the instrument should be reapplied, and worn until the hour of going to bed, which should be early, and as nearly as possible at the same time every night. Much advantage will accrue from following a well defined rule in these particulars, the system becoming habituated to the various curative agents very readily, when they are resorted to at the same hour every day.

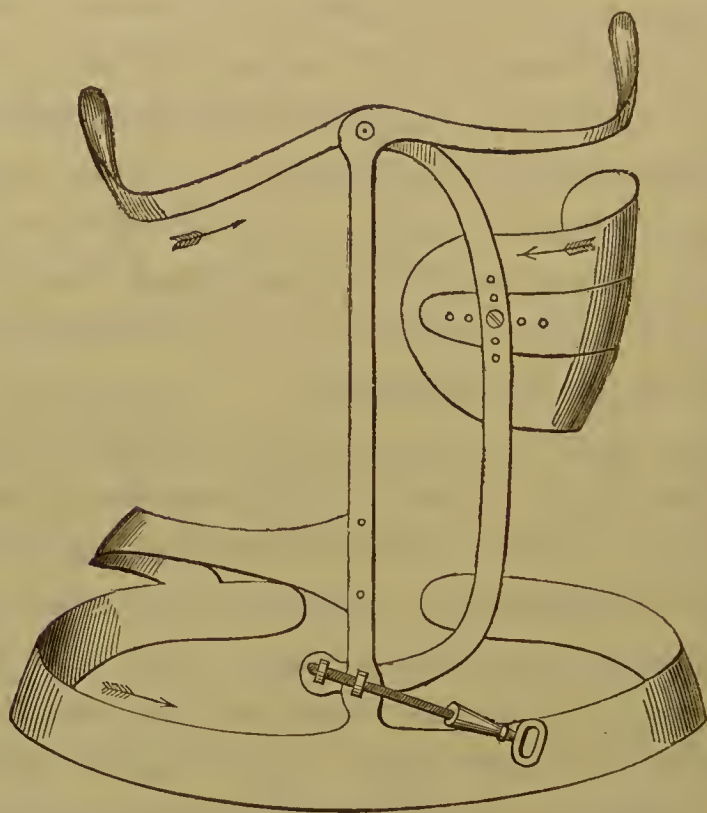
If the instrument be employed, in the manner recommended above, the following advantages may be confidently anticipated to supervene upon its application.

The left, or depressed shoulder, is gradually elevated to its natural level, and direct and beneficial action is thereby exerted upon the compressed, and sunken ribs of the left side—the convexity of both the dorsal and lumbar curvatures are firmly and uniformly pressed upon; and the spine is consequently induced to resume its natural and perpendicular direction—the superincumbent weight of the superior half of the body is removed from the debilitated vertebral column, and thus a direct opposition to its recovering its perpendicularity is at once removed—the employment of the crutch heads tends to draw backward the scapulæ, and by so doing to expand the chest, giving an increased and healthy power to the respiratory organs—and, above all things, by the aid of the apparatus the patient is enabled to walk out, or engage in such active pursuits, as must tend very materially to the preservation of her health, the gratification of her mind, and the relief of that monotony, which must, to a certain extent, attach to the other parts of her treatment; and all this whilst her cure, is steadily, and surely progressing; and whilst, too, even the slightest temporary injury from the effects of pressure is at once obviated and guarded against, by the one simple and necessary precaution of wearing the instrument only for a short period daily, instead of for twenty-two hours out of the twenty-four.

Such, then, is the instrument, and such are the effects that it is competent to produce; and without attempting to throw around its mechanism, or its principle, a mantle of mystery or concealment, to reserve to myself its exclusive employment, or in any way to protect it from the adoption of others, I freely give it forth to the profession for their use, and I trust for their approbation, stating merely that I do not hold myself responsible for any evils it may originate, if employed beyond the maximum period that I have prescribed for it; I hope, indeed I am quite confident, that they will find it equally as effectual, and equally as useful as I have found it, provided they adhere to the rules that I have laid down, for its application.

In all severe cases of lateral curvature, where the dorsal and the lumbar deflections are distinctly defined, and where there exists a considerable degree of projection upon the convex aspect of either curvature, then is this instrument fully competent to contend against and overcome every peculiarity and difficulty. But there is yet another class of cases, where the curvature of the spine is unilateral, instead of bilateral—where, in fact, the vertebral column simply yields to one side, and where but the slightest corresponding or compensating flexure can be discovered in any other situation. In such instances as these, I have found that a different apparatus was required, and for that purpose I

have contrived the instrument represented in the subjoined sketch: it is much less powerful than the one last described, but infinitely more effectual in redressing those cases of distortion, where we have only to contend against a single curvature in the dorsal region, instead of, as in ordinary cases, two well marked and distinct deflections. Its capability



of elevating the depressed shoulder, whilst the left ribs remain uninterfered with, its power upon the projecting right side, and its total indisposition to tilt or become displaced, is equalled to that of the other apparatus; but it is divested of the lumbar portion, which we found to be so essential in



benefiting a double curvature of the spine; but which, in the particular kind of case now under consideration, would not only be without advantage, but positively injurious.

At the present time, there is a young girl in the "Hospital for Distortions," Portland Road, whose curvature is of this single or unilateral description, and she is using the instrument last named with the most undeniable advantage.

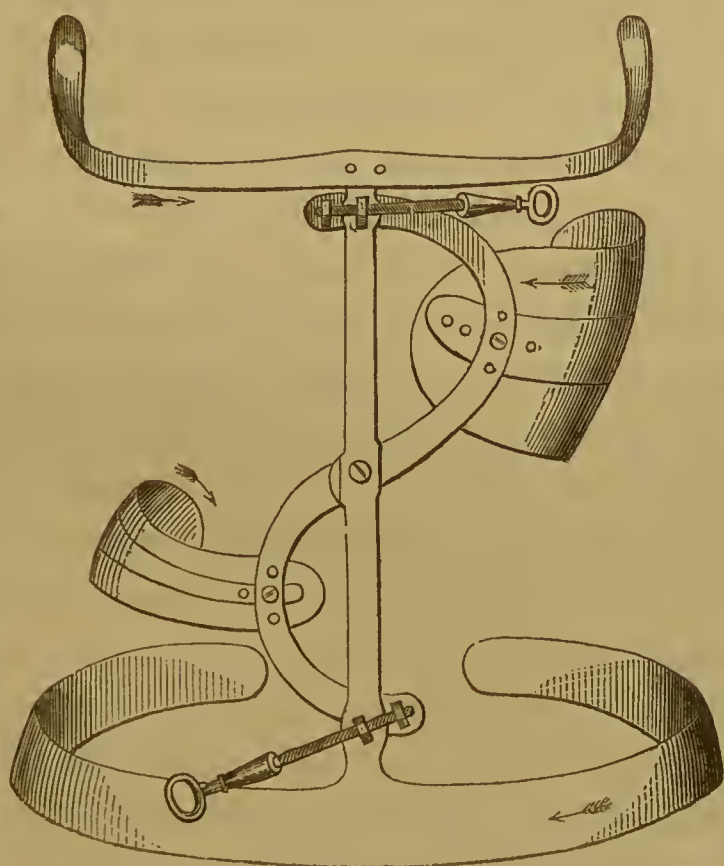
As in the instance of the former apparatus, so likewise in this, its employment should be occasional not constant, avoiding even the contemplation of its being worn at night; for, if it be used for the space of five or six hours daily, either at one period, or twice, as circumstances may appear to indicate, it will be amply sufficient for every useful and salutary purpose; indeed, such a course will tend much more towards the patient's recovery, than when pressure and fatigue, consequent upon its longer application, are causing an amount of debility and prostration, that may very possibly peril the patient's existence. I care not whether the case be slight or severe—the circumstances are parallel—the unremitting use of mechanical support is fraught with the most imminent danger; and recovery cannot, saving in the most exceptional instances, supervene, unless muscular exercise, and occasional recumbency, be added to other remedial measures.



As a proof of this statement, and it is a very conclusive proof, I would instance the case of a little girl, who is at the present time under my care, and who some months since was brought to me suffering from a lateral curvature of the spine. Her parents were unwilling that she should be removed from school, and consequently requested me to let her have an instrument that she might wear constantly, promising to let me see her occasionally. I unwillingly yielded to their wishes, and furnished her with the desired apparatus. At first she certainly derived benefit from its use, and I was beginning to doubt in my own mind, if my objections to treating a case by means of mechanical support alone, were correctly founded. A very short period, however, served to remove this impression from my mind, for she became delicate and debilitated—the muscles of the back grew almost powerless—and the poor child was very evidently suffering from the severity of a practice, that I most reluctantly was induced to adopt. At my suggestion the parents now placed her entirely under my care, and I commenced to deal with her malady according to the principles that I have attempted to illustrate in the foregoing pages; and I have now the gratification of feeling, that she is almost entirely restored both in health and figure.

Besides the two description of cases already alluded to, there yet remains a third, in which the

spinal curvature has, by long continuance, neglect, and injudicious treatment, attained an excessive degree; and in which also, as a general rule, the patient has arrived at such an age, as to have acquired great rigidity of the parts involved in the deformity: in such cases I have found that the single screw at the lower end of the lever bar, as represented in the preceding pages 80, 86, and 94, was inadequate to the production of a sufficient degree of support and pressure to the protruding shoulder and dorsal deflection of the spine: I have, therefore, contrived a modification of the same instrument, as here represented, to suit these par-



ticular cases; and my experience of its application has not only convinced me of its great utility, but has also afforded me very gratifying proofs of the comfort and support that patients feel from its employment.

This modified apparatus I have delineated, and by referring to the engraving it will be discovered, that in addition to the usual screw at the base of the lever bar, I have added an additional one to its upper extremity, by means of which the power of the instrument is not only very greatly increased, but its pressure is also rendered more steady and uniform.

After a good deal of mature reflection upon the subject of this apparatus, I cannot find any reason for discarding the impression that its first idea suggested to me—namely, that there is hardly an instance of a person suffering from lateral curvature of the spine, in its most aggravated degree—no matter what age the patient may be—to whom its use would not be highly beneficial, and productive of the greatest amount of comfort and support.

As long as the patient is under treatment, the use of one or other of these instruments should be continued; and even when cure, or the utmost amount of benefit that the individual is capable of deriving, has been induced, their employment should not suddenly be abandoned: some apparatus of a less powerful nature should be substituted for it, so

as to avoid the distressing contingency of a relapse, owing to the loss of the accustomed support—for this purpose I have found the lever belt, as invented by M. Hosard, and adopted by M. Tavernier of Paris, to be very useful.

By observing such precautions as these, and by carefully watching the patient, so that she does not assume an injurious attitude, there is but little fear of any retrograde movement arising; and as, by degrees, the muscles regain their wonted power, and a healthy tone of the general system is established, the use of the lever belt may be discontinued, and the patient will grow up strong, vigorous, and frequently of very pleasing proportions.

A variety of means have, at different periods, been adopted for procuring mechanical support, and representations of so-called “spinal chairs,” or “stools,” with sundry “pads,” and “jointed crutches” to match, may be found in the works of Messrs. Duffin, Tuson, and various other writers on the subject; but I cannot think that they are calculated to produce more benefit than is to be obtained by the simpler means above enumerated.



## SECTION IV.

## THE SUPERADDED, OR ADVENTITIOUS REMEDIES.

*The Superadded, or Adventitious Remedies*, comprise such as do not strictly pertain to either of the foregoing classes of curative agents: they are friction, and other manipulations; cold or tepid bathing; and the exhibition of tonic medicines.

*Friction*, when properly employed, is a valuable, and almost indispensable adjunct to other treatment; for through its instrumentality we can promote muscular developement, excite to action the capillaries of the part, and remove the evil effects, that without its agency would very possibly attend upon the employment of pressure, or the necessary confinement for a considerable number of hours to one position; in fact, as was so truly observed by Sir Benjamin C. Brodie, Bart., in a lecture delivered at St. George's Hospital, in December 1846, "Friction and shampooing act upon the muscles to a certain extent, in the same manner as exercise, and in the case of delicate girls, who in the first instance are not able to take exercise in any efficient manner, may be substituted for it. It will, however, be of little service unless it be employed for one or two hours daily, and it should be



applied not only to the muscles of the back, but to those of the chest and extremities.”

There is just as much difference between the effects produced by friction, when administered by a person who has habituated himself to its judicious application, and one who has never given a moment's attention to the subject, as there is between the mechanical contrivances that we now make use of, and the unwieldly machines that so delighted the imaginative faculties of the learned of former days. The good results of this remedy, when rightly employed, were first demonstrated by Mr. Grosvenor, of the Oxford Infirmary; and I would strongly recommend to such as are about to enter upon its application, the perusal of a small work by his successor Mr. Cleobury; or otherwise their exertions may produce infinite mischief instead of benefit. I have lately had an opportunity of seeing a case, where decided injury has arisen from friction misapplied.

Pressure, too, upon the projecting shoulder, by means of the hand, is usually attended with advantage; it should be of a gentle, moulding nature, rather than a forcible shock, or a hammering process.

Both these remedies must obviously be employed for a considerable period daily, at least for two hours at repeated intervals, or their use will be unattended with benefit.

*Cold or Tepid Bathing* is useful, in certain cases, such, for instance, as those where excessive debility is present; but, in my opinion, they are remedies better calculated for the after-treatment of a patient, where comparative cure has been effected—for, as a general rule, it will not be found that our objects are furthered by inducing a very tonic state of the muscles at the outset of the treatment, on the contrary, cure is occasionally retarded by such a course. In some instances, where unusual strength and rigidity prevailed, I have found benefit from the use of the warm bath—an agent that is particularly indicated at certain periods, when the menstrual function is materially deranged.

*Tonic Medicines*, such as the various preparations of iron, bark, small doses of zinc, the mineral acids, and cod-liver oil, are indicated in some particular instances; but others there are, where such agents are better deferred until much of the deformity has yielded to mechanical treatment.

The diet should be light and nutritious, but not stimulating: it should be taken at regular intervals, and in sufficient quantity to support the requisite strength of the patient; but all excess, in animal or vegetable food, should be avoided. Due attention must be paid to the condition of the bowels, which should act at least once every day; and in case the catamenial discharge is irregular, or vicarious, it should receive very prompt attention—those

remedies being exhibited which the peculiarity of the case may indicate. In cases of amenorrhœa, or suspended menstruation, I have found much benefit from the use of the iodide of iron—the *pilul. ferri c. myrrhæ*, &c.

In those cases, where any active agent is tending to increase the affection, and baffle our efforts—such, for instance, as a weakness of the ankle, or any other impediment to the equal action of both lower extremities—a tumor growing upon the side of the neck—the cicatrix of a burn or scald—it appears superfluous to say that their removal must be provided for, before we can hope for benefit in the spinal disease.

Having now given an account of lateral curvature, together with the remedies that are competent to its removal, and expressing my entire conviction that almost every case, occurring before the period of growth has terminated, may be effectually cured—whilst there are but very few, no matter what the age of the patient may be, who are not susceptible of sufficient benefit to compensate them for the time devoted to its acquisition—I will conclude by referring my readers to the three following cases, which I have selected from a long list of others, not because they are particularly striking instances, but on account of their presenting to our notice many of the peculiarities that I have endeavoured to point out in the foregoing pages.

## CASES OF LATERAL CURVATURE.

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### CASE I.

Clara Adams, 17 years of age, residing with her parents at Acton, Middlesex.

This girl appears to have been perfectly strong and healthy, up to the age of fourteen years; but about this period her mother began to observe that she lost flesh, and gradually contracted a habit of stooping. No particular notice was taken of these circumstances, and the child pursued her usual mode of life, until at the expiration of a few months the weakness had become very considerably increased, and it was with difficulty that she could walk, even for a short distance.

Whilst these symptoms were causing the parents much uneasiness, it was discovered, by mere accident, that the girl's back was becoming deformed, and that the right shoulder was beginning to project. She was taken to a medical gentleman, who ordered her to lie down, telling her that by such means she would soon recover. Recovery, however, did not supervene, and she applied to some homœopathic establishment, where it is needless to



say that the remedies employed were attended with but very doubtful success. Week by week she continued to get worse; the debility of the system increased; the stooping posture became more confirmed; the projection of the shoulder assumed a more decided and striking character, and the spine yielded gradually.

In March, 1850, she applied to the "Hospital for Distortions," Portland Road, and was admitted as an in-patient. Upon examining her condition at this period, I found that she was suffering from a very severe lateral curvature of the spine, which was of a somewhat serpentine character. The dorsal portion of the vertebral column had swerved towards the right side, and was very considerably removed from the median line. The vertebræ in this situation had also suffered a great amount of rotation, so that the angles of the ribs projected, thus causing the apparent enlargement of the right shoulder. The scapula of the right side was elevated, and dragged away from the median line; its inferior angle was tilted upwards, which caused a great amount of disfigurement.

Turning to the left side, I found an unusual degree of curvature in the lumbar region, the convexity of which looked in a direction the opposite to that of the dorsal deflection. In this situation also, the vertebræ were much rotated. The true axis of the pelvis was considerably deranged; the



left hip protruded, and thus a most awkward gait was imparted to the patient's figure.

The left scapula was depressed very considerably below its natural level, its inferior angle almost touching the crest of the ileum. The ribs of the same side were sunken and crowded together; and the muscles hung loosely over the diminished space. Beyond these symptoms there also existed an unusual degree of curvature in the cervical portion of the spine; and, in consequence, the head was much inclined to one side.

Respiration was difficult and oppressed; and upon examining the chest with the stethoscope, I could barely discover that the left lung acted at all. The heart was pressed upon, and its function interfered with, the slightest motion serving to excite it to the most violent action.

The girl's health was decayed and broken up—the bowels were confined, and the periodical discharge was attended with much pain, as well as being subject to great irregularity. She complained severely of debility; and could not, even with a forced effort, draw herself up into the erect attitude. She was fatigued upon the least exertion, and constantly complained of great shortness of breath. Her countenance displayed in a very marked degree that peculiar and characteristic appearance, that so surely indicates the presence of spinal distortion.

As soon as she became an inmate of the Hospital, she was placed in the recumbent position—sometimes the prone, at others the supine, and occasionally the lateral; slight doses of mercury and colocynth were given in order to get the digestive function into a healthy condition; and, as soon as this was effected, the lighter tonics were administered. When she had somewhat recovered her lost strength, she was cautiously accustomed to a vigorous system of gymnastic exercises—resuming the recumbent posture the moment fatigue was induced. Friction and other manipulations were applied to the spine, and the muscles of the back generally; the diet was carefully regulated, and sitting or standing still were strictly prohibited.

This treatment had barely been persevered in for the short space of six weeks, before a marked change was manifested in the girl's condition. The breathing became calm and placid, instead of hurried and difficult. The general strength of the system increased; the bowels acted regularly; the appetite improved; the countenance no longer retained its haggard and worn expression, but on the contrary became animated and full of vivacity; whilst the deformity of the spine had visibly diminished.

Day by day as the vigour of the system improved, the employment of the exercises was proportionately increased, the mechanical instrument

was prepared for her, by means of which she was able to walk out in the Regent's Park, and very soon she was enabled to enjoy this species of pastime for the space of an hour and a half or two hours, without feeling fatigue. The depressed shoulder gradually became elevated into its natural position; the crowded condition of the left ribs was relieved; and the intercostal spaces resuming their wonted dimensions, the respiratory power of the left lung became equalled to that of the right. By degrees the protrusion of the hip disappeared, and the fulness of the ribs of the right side diminished greatly, the right scapula sunk almost to a level with the one of the opposite side, and its inferior angle ceased to project. The curvature of the cervical portion of the spine could not now be detected, and the head was consequently carried in the median line. Much of the dorsal deflection had also disappeared, and the lumbar had also yielded to treatment to a certain extent, but owing to the strength and power of the ligaments in this situation, the salutary change was somewhat less observable in this portion of the column.

At the present time the girl is almost entirely well, her health being perfectly reestablished, and the system generally has regained its natural vigour: she is capable of taking almost any amount of exercise without experiencing fatigue.

As regards her figure—when dressed no trace of

the deformity can be detected, the shoulders being perfectly even, and the hips upon their natural level: if the spine be examined when she is undressed, the situations of the dorsal and lumbar curvature can still be recognized, and some degree of fulness of the right shoulder is discernible; but the muscles are strong, her figure set, and the body is supported erectly, and she will shortly be discharged essentially cured, permission being given her to carry the instrument home.

## CASE II.

Miss H——m, æt. 13 years, the daughter of respectable parents residing in the neighbourhood of Brixton.

Previous to the age of twelve years, the child was very strong and active, capable of enduring considerable fatigue, and habitually engaged in the sports and pastimes of childhood. About this period she was sent to one of the high-pressure boarding schools, where, with the very best intentions, the superintendent imposed upon her the most inordinate degree of mental exertion: she sat for many hours daily at her various tasks, rose at six o'clock every morning, seldom took exercise beyond a limited and formal walk; in fact, her life was suddenly changed from one of activity and exercise in the open air, to that of the most complete torpidity in a crowded and unwholesome apartment. A short time only was sufficient to afford evidence of the injurious consequences that were produced by this unfortunate change—she became pale and emaciated, losing her natural vigour and vivacity. Very soon she had become quite thin, and complained of feeling weak—a little while longer, and she required constantly admonishing to hold herself upright—and, at no very distant period, it was found that



her spine had swerved from the median line; in fact, lateral curvature had supervened upon the debilitating influences to which she had, by her new and sedentary mode of life, been exposed.

With a view to stay the ravages of the disease, she was put into stiff whalebone corsets, which were laced violently tight; and, which it is needless to say, served to increase the debility of the system, and indirectly also the deformity, in a very eminent degree.

The parents, becoming alarmed for the safety of their offspring, sought the advice of their medical attendant, who sanctioned the use of the stiff stays, and advised her mama to take her to the sea-side. The very best of air, the most nutritious diet, the rigid perseverance in pulling the corsets tightly, failed to improve the child's health or figure; on the contrary, she got rapidly worse, and ultimately became the victim of mechanical empiricism.

Every week gave evidence of the onward progress of the curvature, various measures were adopted at the outset with hope, but ultimately abandoned in despair. This state of things continued up to May 1850; when, through the persuasion of some of my friends, her mama was induced to consult me about her.

Upon examining the spine, I discovered a very considerable lateral curvature, occupying the ordinary situation. The dorsal portion of the column

diverged towards the right side; the angles of the ribs of the same side were rendered more conspicuous, owing to the rotated condition of their vertebral attachments; the right scapula was tilted upwards, and its inferior angle projected prominently; whilst the spinous processes of the fourth, fifth, sixth, and seventh dorsal vertebræ, were almost concealed under the protruding mass of the right side.

The lumbar vertebræ occupied a position to the left; and, according to the parent's account, it was in this situation that the curvature had first manifested itself. In this portion of the column there was also considerable rotation of the vertebræ, the transverse processes projecting in a marked degree towards the left side of the lumbar deflection. The true axis of the pelvis was lost, and the *right* hip appeared to protrude. Beyond this state, there was a slight curvature in the cervical region, the head being carried with an inclination towards the left side.

The child was excessively weak, unable to bear fatigue, and dejected in spirits. The true centre of gravity was gone, and the body presented a very distorted appearance. She had great difficulty in holding herself upright, and constantly dropped forward when unobserved. The catamenia had not yet made its appearance; the digestive process was impaired, and the bowels acted irregularly. Res-

piration and circulation were also considerably affected.

As soon as the child was placed under my care, I put her under the treatment that I have attempted to illustrate in the foregoing pages. I employed the recumbent position—sometimes the prone, and at others the supine—at all times, saving when she was using the gymnastic exercises, or walking in the open air in her mechanical support. Occasionally I used also the position for procuring lateral flexion of the spine, but found that it required very constant and careful watching in order to guard against the evil consequences that it is capable of producing, when too frequently resorted to. Twice daily, I employed mechanical extension with indisputable benefit; and at stated periods, I applied lateral pressure and counter-pressure by means of the apparatus represented at page 59.

Two or three times every day, my patient resorted to the various gymnastic and calisthenic exercises, that I found to be indicated for improving her particular case, employing them just so long as to induce slight fatigue, and then ceasing, returning again to the supine position.

Every morning, when not actually raining, she walked out in the instrument I have spoken of as so essential to the cure of lateral curvature, for the space of one or two hours according to the state of her feelings. In the evening she again had the

apparatus put on, by which means it was worn for four hours daily, the longest period for which I sanctioned its employment in this particular instance. Friction and other manipulations to the back were steadily persevered in; and I enjoined the strictest regularity and moderation respecting her diet, which I ordered to be light and nutritious, but not stimulating.

Under the combined effects of this treatment, I soon observed the most marked and gratifying change in my patient's condition. Her health, her spirits, her countenance, the increased power of respiration, the daily diminishment of the spinal distortion, all testified to the efficacy of the measures I had been fortunate enough to adopt for her restoration.

She continued to improve uniformly, daily gaining strength and increasing in activity; the remedies were persevered in without intermission; and at the end of November, seven months after she was first brought to me, I pronounced her to be entirely restored. Upon her returning home, I directed her to continue the use of the instrument, and to have the back sponged with salt and water every morning—still persevering in the friction. In addition to this I prescribed for her *tr. ferri mur. m. xv ter. in die*—precautionary measures for preventing the chance of any retrograde movement.



## CASE III.

I do not purpose entering into the full details of the following case, since I have already cited sufficient, to illustrate the nature of lateral curvature, and the treatment necessary for its removal. I merely allude to it here, because it was one presenting some well marked peculiarities: and because, too, the measures employed for the restoration of the patient, were ultimately crowned with very gratifying success.

Mary Anne King, 17 years of age, residing at Barcombe, Sussex, was admitted into the Hospital about June 1850. I chanced to be visiting the patients in one of the wards when she was carried up stairs, and from the excessively helpless condition in which she appeared to be, I at once concluded that she was suffering from caries of the spine, and paralysis of the lower extremities. Upon coming to examine her, however, I found that I was mistaken, for instead of there being any trace of a carious condition of the vertebræ, there existed an excessive degree of lateral deflection of the spine, which was of the unilateral form, existing only in the dorsal region; in fact, the whole of this portion of the spine, had swerved over towards the right side, and the muscles of the back were so

debilitated, that they were almost in a state of paralysis. From the same general weakness of the system the lower limbs were quite powerless; so much so, that the patient was not only unable to attempt to stand, but could scarcely draw them up in bed.

The health was much impaired, the countenance worn and haggard, and the whole frame was in a condition of general debility and prostration. I should mention that the girl had, for a long time previous to her becoming affected with lateral curvature of the spine, suffered from extreme lameness, in consequence of the presence of "talipes equinus," or "elevated heel," in the left leg, to which must, without doubt, be attributed the origin of the spinal distortion.

Varying from the rule I generally adopt in the treatment of ordinary cases of lateral curvature, I directed this girl to be placed in the prone position, prescribing for her preparations of bark with acid, small doses of sulphate of zinc, the various forms of iron, and ultimately the cod-liver oil, giving the nurse strict injunctions to use friction to the back once or twice daily. Her diet was light and generous, consisting of animal and farinaceous food, with a small quantity of beer; and the regular action of the bowels was ensured by slight doses of aperient medicines.

In a very short time, the girl began to improve

in every way—her health, her strength, her appearance, the appetite, all testified to the same fact. In a comparatively brief period, she had acquired so much strength in the muscles of the back that she was enabled to sit erectly; still, however, incapable of standing.

The remedies were steadily persevered in; she attended strictly to the injunctions laid down for her guidance; and, by degrees, she so far recovered as to be enabled to walk with the aid of crutches. When she had attained this stage, moderate exercise was resorted to, and her improvement was proportionately accelerated. Measures were taken to remove the talipes equinus, which had produced so much distortion of the foot—an instrument was provided for her, and she was discharged, some few days ago, quite recovered. I have since heard from her, and find that she can walk about, even without the assistance of the crutches, suffering little fatigue or inconvenience therefrom.

## CHAPTER IV.

### ANGULAR PROJECTION, OR CARIES OF THE SPINE.

ANGULAR projection, or “curvature,” as it is sometimes erroneously called, is that particular form of spinal distortion, where the vertebræ project backwards, as in “excurvation,” only in a more marked degree; and as the deformity originates from actual loss of substance in the anterior parts of the bodies of the vertebræ, so is there always found one of the spinous processes protruding in a more prominent degree than the others, and thus forming a sharp knuckle, or angle, which has given rise to the expressive name of the disease.

The appearance given to the projection by this circumstance, is at once peculiar and characteristic; and, in itself, is quite sufficient to distinguish it from any other form of spinal distortion—for in excurvation, or posterior curvature, the only variety with which it could be confounded, we find an uniform and general bow, instead of a prominence, so essentially angular, as is the one now under consideration.

As we found lateral curvature following in the wake of luxury and refinement, and almost re-



stricted to the high-born, so caries of the spine appears to be an attribute of squalid misery, affecting principally the ill-fed children of the poor, who reside in damp, unhealthy localities.

When a slight degree of angular projection exists, it is productive of less actual disfigurement than are the incipient stages of the other varieties of vertebral diseases; but its tendency is to increase more rapidly: and, when in its advanced stage, it not only produces a greater amount of visible deformity, but is altogether more serious in its consequences, for if the malady be not arrested in its incipency, it goes on to the formation of abscess—extreme debility—hectic—and probably death.

No period of life appears to be exempted from its attack, but it seizes upon the young or the old, who become exposed to the causes inducing it: its most frequent victims, however, are young children of a scrofulous diathesis, from the ages of four to twelve years, possibly because they come more immediately under the influences of its exciting agents.

I am in the daily habit of examining great numbers of such poor children at the “Hospital for Distortions,” and witness the disease in every varying stage of its distressing career.

Angular projection furnishes two well marked and distinctive stages—the first maintains, during the period that ulceration of the bones is in actual

progress, and may be denominated the “*ulcerative*” or “*carious*” stage: the second is consequent upon the first, being in fact the deformity that results from it, and may thence be called the “*consecutive*” stage.

It may be briefly stated, that it is during the persistence of the first stage, that remedial measures are to prove most efficacious, as none, or very little, influence can be exerted upon the deformity when it has once become rigidly fixed by ankylosis.

For an explanation of the true nature of this disease, more especially during the prevalence of its first stage, the profession is greatly indebted to the late Mr. Pott, who first drew attention to its most important features; hence it is not unfrequently called “Pott’s disease:” and upon the Continent it is known even to this day, as “*La maladie de Pott.*”

All parts of the spine are occasionally found to be the seat of the disease; but its most frequent situation is the dorsal, then the lumbar, and lastly the cervical vertebræ.

As a general rule the affection makes much more rapid progress in the lumbar, than any other portion of the spine, obviously on account of the greater weight that is pressing upon this part, and the difficulty that arises in keeping this region of the spine in a state of tranquillity—a condition so essential to the alleviation or recovery of the patient:

it is, however, worthy of remark, that the ultimate consequences of the disease are less serious in this, than in the other situations.

Following a similar method of arrangement to that adopted when discussing the subject of lateral curvature we will consider—

First, The symptoms.

Secondly, The causes.

Thirdly, The pathological changes and general effects.

Lastly, The treatment of this truly formidable disease.

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## SECTION I.

### THE SYMPTOMS OF ANGULAR PROJECTION.

There are certain general symptoms, which serve to characterize caries, in whatever portion of the spine the attack may originate; and, in the advanced stage, these are sufficiently well marked to leave no doubt as to the real nature of the disease. But there is another enquiry equally interesting and important; namely, to discover the leading features of the affection, as it occurs in the different divisions of the vertebral column; and as this is a

subject demanding considerable attention, we will first consider the nature of the general symptoms, and then those that characterize the malady as it occurs in each separate region.

The early indications of caries are so ill defined, and in many cases of such an equivocal nature, that the surgeon is rarely consulted about a case, until it has so far advanced, as to have given rise to some change in the patient's figure: to those, however, who are accustomed to investigate the peculiarities of this disease, the following symptoms will be recognised as characteristic of its early stage.

No constant pain is felt at first, but the patient will suddenly scream out with a violent paroxysm, that seizes him in the back; but which in a moment disappears just as quickly as it arose, and that too without leaving a trace of its having occurred; indeed, in the case of children, where the disease is so intimately allied to the strumous habit of body, it is not uncommon to find that a considerable angle has already been produced, which has at no period occasioned them any very violent pain; and it is only some accidental circumstance, such as jumping, suddenly twisting the spine, coughing, sneezing, and above all, the occurrence of hiccough, that originates symptoms characteristic of a carious condition of the vertebræ. Upon examination, however, the appearance above alluded to, but too surely indicates the advanced state of the disease.



Far different, however, are the early symptoms that usher in the complaint in those of more advanced years, in whom the scrofulous tendency is entirely or comparatively dormant. In such cases the pain is often most severe and violent, being subject to the most excruciating exacerbations, even upon the slightest movement.

It is not unusual to find that children, who do not complain of pain during the day, are nevertheless subject to considerable uneasiness at night, frequently waking up startled, screaming out in their sleep, and giving various other signs of disturbing influences. In every case, where the pain in the back exists at all, it is increased by percussion over the part; but be it remembered, that the early stage of caries may be making gradual progress, and yet percussion give no clue to its presence—a circumstance that must be accounted for by the fact, that the disease is confined to the bodies of the vertebræ, which being at some distance from the surface, fail to experience the influence produced by percussing over the spinous processes. We must not, therefore, conclude that because there is no pain, and because we can strike over the situation of the vertebræ from the sacrum to the occiput, without producing uneasiness, that the patient is exempt from caries of the spine. Before arriving at such a conclusion it will be well to make him hop for two or three paces on one or both feet,

when the shock communicated to the column by this jarring motion will pretty clearly indicate the condition of its various structures.

There are few diseases that require more minute investigation or discrimination, in order to detect their insidious invasion, than does the one now under consideration. Of course when the angle is once formed, all doubt as to the true nature of the malady is at an end—at least it is natural to suppose so—though a little child was brought to me a few weeks ago, who had been for some time under eminent medical advice for a so-called disease of the hip-joint, which, however, I failed to discover, notwithstanding that I gave a protracted and careful examination to the condition of this part. Observing, however, a large piece of leather fastened upon the child's back, I directed my attention to the spine, and to my astonishment I found a considerable angular projection of the lumbar vertebræ, which, it is needless to say, was the sole origin of the poor girl's sufferings.

Under ordinary circumstances, therefore, the first thing that the surgeon is consulted about is a slight protrusion in the back, which, in all probability, has been discovered by mere accident; and, as the patient has never complained of any severe suffering, so it is most common for the parents to say, that it has only been “growing out” for a few weeks, though it is very obvious, that caries must

have advanced to a considerable extent before it could have originated this severe condition.

The physical character of the projection has already been sufficiently dwelt upon: it is sharp and angular, and may at present be formed by the protrusion of a single spinous process only; or it may be more, according to the period that the disease has existed. The patient may, or may not, experience acute pain in the gibbosity; but motion and percussion always increase it, when it is present even in ever so slight a degree.

The general health is not necessarily impaired, some little derangement of the digestive organs being the only marked change in the patient's condition.

As the disease advances, the projection increases, and the body falls forwards, until by degrees such an amount of stooping is induced, that the patient is unable to stand without supporting his hands upon his knees—a position that gives to his figure the most distorted and pitiable appearance.

By degrees one, two, or more vertebræ, above and below the prominent one, become involved in the disease, and thus tend still more to deform the body: and it is not unworthy of remark, that the vertebræ below the seat of diseased action, are more liable to become implicated than are those above—a fact that may be accounted for by a variety of circumstances.

Thus far the characters of caries are the same in whatever portion of the spine it occurs, and we have next to enquire what are the distinguishing features of the disease, as it attacks the different divisions of the column.

When the *cervical vertebræ* are the seat of disease, we find that there is the general characterizing pain; but that it is much increased by movement of the neck—on which account the patient is very generally observed to carry the head fixedly, turning it cautiously, and often supporting the chin upon the hand. Percussion does not appear to occasion any very great accession of pain, when the disease is located in this situation, probably owing in some measure to the great depth of the vertebræ, and the protection afforded them by the *ligamentum nuchæ*. Pressure upon the vertex, however, always gives rise to considerable uneasiness.

A great amount of disease may go on in the cervical vertebræ, without producing a corresponding amount of visible deformity, obviously because of the shortness of the spinous processes in this region; but this is the situation above all others where the most sudden and alarming consequences may ensue, for as ulceration proceeds, the odontoid process becomes involved in the disease, and being set free from the embrace of the transverse or cruciform ligament, pressure is made upon the substance of the chord, and the patient dies asphyxiated; or he



may continue to exist for a short period, with the function of respiration so materially interfered with, as to render life intolerable.

In those cases where the disease attacks the *dorsal vertebræ*, we find a much more considerable projection, especially where it is confined to the upper portion of them; and as we saw the small prominence in the cervical region to be occasioned by the shortness of the spinous processes in this situation, so may the length of these processes in the dorsal region, account for the magnitude of the protrusion in that part.

Pain in and about the thorax is also a characteristic symptom of the disease in the upper dorsal vertebræ, whilst the abdominal cavity is usually affected, when the morbid action occurs lower down. The digestive process is generally more or less deranged, the liver being disordered, and the bowels torpid; frequently the urine is high-coloured and devoid of its usual transparency—circumstances that have led to the supposition that the kidneys were in a diseased condition. The muscles forming the abdominal parietes become weakened and enfeebled, and gradual paralysis of them, as well as of those of the lower extremities supervenes—a condition that will be particularly noticed in another place.

Where caries attack the *lumbar vertebræ*, there is usually present the pain before mentioned, which

is still of the same vicarious character: it is increased upon percussion, and is subject to great exacerbation by any sudden movement of the body, or by attempting to stoop; much weakness and fatigue is also complained of in the situation of the loins. The projection is not nearly so prominent, nor are the paralytic symptoms so frequently produced, when this portion of the column is diseased, both of which circumstances are to be explained by the larger size of the bodies of the vertebræ, which are thus enabled to sustain a much greater degree of disease, without the supervention of such frightful consequences.

Perhaps there is no other morbid condition of the bones that is so little disposed to get spontaneously well, as is caries of the spine, for in the majority of instances—unless indeed judicious treatment be adopted—the disease goes on from bad to worse, the patient gradually becomes excessively weak and emaciated, suppuration and hectic supervene, and death puts a period to his existence.

## SECTION II.

## THE CAUSES OF ANGULAR PROJECTION.

What are the causes of this alarming disease? They appear to be of two kinds—First, the “pre-disposing;” and secondly, the “exciting.”

The *predisposing causes*, are the tubercular, or strumous diathesis, occurring amongst persons who are exposed to cold and want, and other analogous influences inducing general debility; hence the most frequent victims of its attack, are the ill-fed children of the poor, who reside in thickly populated and unhealthy districts, and who have not stamina sufficient to withstand the noxious influences to which they are daily exposed.

The *exciting causes*, which call the latent disease into activity, are mechanical injuries applied directly to the spine; which, in the class of persons who are especially liable to suffer from the malady, appears unable to resist contingencies, which would have occasioned little or no mischief in those who were placed under more favourable circumstances, and whose constitutions were consequently stronger.

The *modus operandi* of such injuries, is very similar to that which occurs in any other region, where disease supervenes upon injuries of a mechanical nature; namely, they excite inflammation, which not only remains unchecked, but which is

materially heightened by every movement of the trunk; and this proceeding to an excessive degree, induces ulcerative absorption either primary, or secondary, of the bodies of the vertebræ. The inflammatory action extends, and the ulcerative process is not slow to follow it—several bones are ultimately implicated in the disease—pressure is made upon the chord inducing paralysis, and very generally pus is formed in large quantities; and soon the patient is placed in a condition almost unparalleled in the catalogue of bodily sufferings.

In those cases that occur in persons of more advanced age, after the period of puberty, the disease is less connected with scrofula; and in such as these, it is usually excited by rheumatism; or occasionally from some syphilitic taint. These are the cases, however, that the most readily yield to treatment, and they are upon the whole far less serious in their ultimate consequences.

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### SECTION III.

#### THE PATHOLOGY AND GENERAL EFFECTS OF CARIES AND ANGULAR PROJECTION.

During the incipient stage of caries few opportunities occur of making examination to discover the morbid condition of the parts affected, but



instances are sufficiently numerous, in its more advanced condition, to demonstrate to us the true nature of the disease.

A few months since, I, in conjunction with another surgeon, made a careful *post mortem* examination of the spine of a little child, whose death was occasioned by caries, which involved the three lower dorsal, and two upper lumbar vertebræ.

The appearances presented at that examination may be very briefly enumerated. The interarticular fibro-cartilages, that should have existed between the two centre vertebræ diseased, were entirely consumed; whilst all but the central portion of that one, which originally occupied the situation between the ninth and tenth dorsal, was in the same condition; and the portion of it which remained was jagged and bathed in pus. The bodies of the two lower dorsal and first lumbar vertebræ were almost completely removed by absorption; and in the cavity, occasioned by the disease, was a large quantity of pus, suspending in it small shreddy fragments, appearing like the *debris* of the intervertebral substances. The cartilage intervening between the second and third lumbar vertebræ still preserved its outward form; but its central portion was excavated by disease, and filled with sanious discharge. No visible ulceration had yet occurred either in the second lumbar, or ninth dorsal vertebræ; but they presented a dark purple, chocolate colour, indica-

tive of the presence of inflammatory action. On the anterior portion of the column, in a situation somewhat between the limits compassed by the diseased action, was the sac of a large abscess, in which was much flaky pus of a cream-like consistency, and which in all probability had occasioned the patient's death.

Not more than a few days since, I went with the house-surgeon of the hospital to which I am attached, to examine the spine of a boy, 10 years of age, who had fallen a victim to this terrible disease. The caries involved the four upper dorsal and the first cervical vertebræ. Upon cutting down to the seat of the complaint, I found no very marked alteration in the figure of the bones; their anterior portions were diminished in thickness, it is true, and their natural appearance was changed: but the most striking phenomena presented by this examination was the complete or partial destruction of the cartilages that intervened between the affected bones — the central portions of the three upper dorsal vertebræ were completely hollowed out, and curdy pus filled up the existing cavities; the remaining portion of these three bones were transformed to mere osseous shells, and large holes existed in them, through which the discharge escaped: they were entirely blackened, more especially the two upper ones, and presented the appearance of a cinder, whilst not a portion of periosteum remained

upon their surfaces. Surrounding the diseased bones, and bathing them upon all sides, was a large quantity of discharge, which had dilated the anterior common ligament into a species of sac, which was so extensive, however, as to permit of the pus passing freely down the spine, until meeting with the origin of the psoas muscle, it followed its course through the pelvic cavity, and finally escaped at the anterior and upper portion of the thigh, just below Poupart's ligament, where it had formed a psoas abscess. So great was the quantity of the matter, that not only had it made its way as above indicated, but some of it had taken a lateral direction, passing between the intercostal spaces and the pleura of the left side; and in one small spot it had even penetrated this latter structure, and found its way into the cavity of the thorax, from the immediate effect of which the patient died.

From these two cases, as well as from others that I have had opportunities of witnessing, as also from the observations on the morbid condition of the structures implicated in the disease, that have been recorded by other authors, it would appear that the pathological changes induced by caries of the spine may be thus briefly stated:—

The person attacked is generally of a scrofulous habit. Some external injury, or occasionally from no very palpable cause, the latent disease is induced to assume an active form; and its first effects are

to excite a certain amount of inflammatory action, either in the cancellated structure of the osseous bodies, or in the cartilages interposed between them. This condition cannot long continue, without leading on to ulceration and caries.

It does not appear to be very clearly ascertained where the ulcerative process first sets in, or indeed whether it always originates in the same structure. I am strongly inclined to believe that, in the majority of cases, it commences in the interarticular fibro-cartilages, whilst more rarely it first attacks the bodies of the vertebræ themselves. In whichever of these situations it does actually begin, certain it is that they both become speedily involved, and that the cancellated structure of the bones is the part that primarily takes on the diseased action. The disease progresses, pus is formed, and an abscess is the result—not unfrequently, too, paralysis supervenes upon this condition. Total or partial destruction of the bodies of the vertebræ ensuing, the trunk falls forward, and the projecting angle, in a greater or less degree, according to the situation of the disease, is established.

It is surprising to what an extent this affection may progress without affecting the integrity of the medullary canal: true it is, that inflammatory action frequently extends to the theca vertebralis, and even to the substance of the chord itself; but there appears to be an especial provision for guard-



ing against any very rapid inroad upon this important structure.

Such are the most striking features exhibited by an examination of those who have died from ulceration of the vertebræ, and who have exhibited symptoms of a decidedly strumous condition of the system; but when the disease occurs in adults from the effects of rheumatism, syphilis, or some such circumstance, these peculiarities are less recognizable.

The experience of all scientific observers clearly proves that the parts destroyed can never be repaired by bony matter, and that the only cure is by means of the upper and lower boundaries of the disease becoming united by ankylosis. I am well aware that this opinion is at variance with the views professed to be entertained by certain individuals, of whose sincerity I will not make question here; but certain it is, that they grossly deceive themselves if they place any confidence in their own theories: and no more credit should be attached to their assertions in this particular, than to the wonderful instances they relate of reducing the most formidable cases of angular projection to a size no bigger than a "hazel-nut." The only cure that can arise, is that alluded to at the head of this paragraph; and no other result should be anticipated or expected, as any attempts to straighten the angle must inevitably be attended with an amount of danger, that would

deter conscientious men from even its contemplation.

Since I have mentioned that the cure to be hoped for is by ankylosis, it is not out of place to state, that this process takes place with the most readiness in those whose constitutions exhibit the least signs of a scrofulous tendency.

Delpech, who has given much attention to caries of the spine, as well as to most other deformities, believes the disease to be dependent upon a deposition of tubercular matter in the cancellous portion of the bodies of the vertebræ—a conclusion that he has arrived at from appearances observed in numerous examinations which he has made. Whether this theory is correct in any case, it is difficult to determine; but certain it is, that many instances occur where this tuberculous deposit cannot be recognized—a circumstance which clearly implies the inaccuracy of the view, as a general rule; but I believe the probability of its correctness in other cases to be so great, that no opportunity of investigating the point should be neglected.

## SECTION IV.

## THE TREATMENT OF CARIES.

When it is considered that the object of any curative measures we employ, is to arrest the morbid action that is going on in the bodies of the vertebræ; and when we reflect upon the impossibility of doing this, at least effectually, whilst the surfaces of the bones are moving upon each other, it at once becomes evident that nothing, which is not combined with the most absolute state of rest in the recumbent posture, can lead to any other result than failure and disappointment. I believe that there are but very few who do not at once admit the fact of this necessity, and I am glad to find that even those who have been led into the error of supposing that lateral curvature can be cured, without having recourse to a reclining posture, are sufficiently acquainted with the true nature of the disease now under notice, to make them adopt a mode of treatment at once more rational, and more congenial to the feelings of the patient.

Be it remembered, that every effort we make must be to promote the process of ankylosis, for that is our cure; and how can this be done, or how can recovery supervene, unless the relation of one portion of the spine to the other be rigidly insured?

In forming our prognosis of the ultimate termination of the disease, much attention should be bestowed upon the general constitution of the patient, as the favourable or unfavourable result of our treatment will mainly depend upon this circumstance—the most gratifying success being anticipated in those cases, who are the least inclined to a scrofulous habit of body. True it is, that by judicious management the majority of patients may be rescued from impending danger, no matter what the peculiarity of their constitutions; but it rarely happens that in an excessively strumous case, the sufferer escapes without a corresponding amount of bodily deformity.

Concluding, then, that it is necessary to lay the patient down, and having decided to do so, it next becomes important to determine upon the best position in which he can be placed for procuring to himself at once the greatest amount of comfort, and the highest degree of advantage: and here I gladly embrace the opportunity of paying a well-merited tribute to the memory of my late Father, who, perhaps, has done more towards pointing out the rational and scientific treatment of this disease, than any other individual who has entered upon its consideration.

In former times, before my Father's untiring zeal led to the invention of the Prone Couch, it was customary to place these patients upon their backs,



either upon a horizontal or inclined plane, which in combination with other treatment equally opposed to ordinary reason, was prone to produce results the very opposite to those anticipated or confidently promised—the disease increased, the patient became emaciated, the projecting bones of the back became denuded from the effects of constant pressure, abscess formed, hectic supervened, and the patient died, a victim to injudicious treatment.

Observing the disastrous effects that so frequently awaited upon this universally adopted practice, and being deeply anxious to substitute in its stead some position that should at least afford the sufferer a greater amount of comfort, my Father devoted himself to the completion of his wishes.

The result of his labours was the invention of the prone couch, in the year 1823—an engraving of which is given at page 59—which afforded a posture the very reverse of that generally employed, and at the same time was calculated to secure every advantage that could be hoped for from the single circumstance of position alone. For many years he continued to use this instrument with the most unvarying success, and when he had fully tested its merits, and proved beyond all doubt its claims to superiority, he publicly advocated its employment, in a paper, read by himself, at the Westminster Medical Society, May 21st, 1836.

The merits of this apparatus were not appreciated by the members of the medical profession only, but they were sufficiently obvious to strike the senses and call forth the plaudits of a large portion of the community, who through the medium of the Society for the Promotion of Arts and Commerce, awarded him a medal for the originality



and great value of his invention, which in addition to admitting the high estimation in which they held his services, proved beyond all power of dispute that he was the first to introduce the prone position, as well as the originator of this useful surgical implement—a fact, which some have attempted to deny, since he was so immediately followed in his views and practice by another gentleman, Mr. Bampfield, that *a very small portion* of the public were inclined to attribute to that practitioner

the merits of first introducing this highly approved position. Such, however, was not the case—as a proof of which I refer my readers to the inscription upon the medal above-mentioned, an engraving of which I have given on the opposite page.

With all an inventor's zeal, my Father at first considered the prone couch equal to the cure of any form of spinal distortion, and under such an impression he introduced it into his practice in the treatment of lateral curvature, and beyond its agency he attempted little for the removal of this affection. In many cases the patient improved, and his expectations were proportionately raised, but I greatly doubt if he gained more than must naturally follow the act of taking from the curved portion of the spine the suberincumbent weight of the head and shoulders; indeed, in the progress of time, this circumstance became very evident to himself, and long before the termination of his eminent career, he freely admitted to me, that the great utility of the prone couch was in the treatment of the disease now under consideration; still, however, strongly advocating the employment of it as an adjunct to other measures for the removal of lateral curvature, owing to its great tendency to improve the condition of the digestive organs, as well as to reestablish a healthy tone of the general system.

In the hands of others, when properly employed, the prone couch has also been found to possess

advantages, for which no substitute could be discovered; and no thinking or unprejudiced member of the profession but now owns its merits and advocates its use. The late Mr. Liston, under whom I studied, and who, from having observed the eminent success that attended the method of treating caries of the spine, as employed at the Hospital for Distortions, Portland Road, which he repeatedly visited, commissioned me to take charge of several cases of this disease which occurred under his immediate notice, so that he might accurately note the results that awaited upon the constant use of the prone position; and so favourable were the effects produced by it in several of these instances, that upon more than one occasion he expressed to me his high approbation of its utility. Feeling, therefore, a great degree of satisfaction at such an expression of opinion from one whose fame extended even beyond European limits, I venture to extract the following sentence from a lecture delivered by him, at University College, on the subject of Caries of the Spine, during the Medical Session of 1843-4.

When speaking of the necessary treatment he says—"In the first place the patient should be kept perfectly quiet, so that the growing together of the parts may be encouraged. *Perhaps the prone position, about which so much has been said lately, is the most favourable, as it takes the pressure off the diseased parts, and prevents the carious bodies from falling in*



*upon one another. It also assists the return of blood from the numerous veins contained in the bodies of the vertebræ, and in the spinal canal."*

Notwithstanding such testimony as this, some there are however—and they hold an exalted position in the medical profession—who, whilst unable to deny the merits of the prone couch, still endeavour to impute to it evils, which long experience has proved incompetent to produce: their opinions, therefore, must necessarily be founded, either upon an ignorance of the effects produced by it, or worse still, they must be conceived in jealousy, that weakest of human infirmities; and I regret to say, that those are not wanting, who, whilst they ostensibly disapprove of its employment, still resort to it upon every occasion, when they can do so without betraying their own inconsistency. One thing may be said of the prone couch, which no plausible argument can controvert; namely, that had those who write upon the subject of caries of the spine depended more upon its auxiliary power, they would less frequently have been put to the disagreeable necessity of recording the deaths of the patients that they have had under their care.

Perhaps there are few stronger proofs of the sterling value of any discovery, than the fact of its calling into existence a multitude of imitators; and if this be admitted, then, indeed, is the prone couch possessed of extraordinary excellence, for in every

quarter it has found persons ready and willing to adopt it and call it their own. Hence at various times it has suffered such additions, clippings, and mutilations, as has not only deprived it of its characteristic simplicity, but also its utility—thus one man has stuck up an ill-shapen board at the top of high legs, and called it an “improved prone couch;” another has added a rest for the head, or some such trivial thing, and has ventured to speak of it, as a valuable addition; whilst others, again, have gone yet less scrupulously to work, and sinking the name of the apparatus and its originator, go on to advocate a similar instrument under another name, calling it their own; whilst more curiously still, one of an “*expanding*” turn has not hesitated to attach the word “patent” to a machine, that was first in use very shortly after the dawn of that gentleman’s existence. But triumphing over the temporary evils that have necessarily attended upon these undignified practices, true merit comes back to the prone couch in its own simple form, experience having long since proved, that the innovations upon its simplicity have only been to set more clearly forth its own inherent excellence.

Many evil consequences that have been attributed to the apparatus, however, may have found their origin in its injudicious employment at the hands of those who were uncalculated to comprehend the proper method of applying it; and I am

not scrupulous to affirm,—that there is not one of all those who pride themselves upon having introduced some vast improvement upon its original form or principle, who has the slightest knowledge of the circumstances upon which its efficacy depends, or of the cases in which it is preeminently serviceable.

I have been led into the foregoing remarks, simply from the feeling that my Father never received the credit so justly due to him for his long services in the medical profession, and the benefits he conferred upon the community at large; and I feel particularly gratified in being enabled, through the medium of these pages, to offer my humble tribute to the memory of one, whose whole life was passed in attempting to soften the bitterness of human afflictions—and who for years spent many hours daily in visiting at their own wretched homes, those poor whose lot was rendered still more miserable by the invasion of such diseases as the one in question.

Let me not be misunderstood, however, in what I have written above, the simple meaning of which is to recommend the prone position, as the best calculated to ensure the success of other remedies. I am not so simple as to suppose, that it is a specific in the treatment of caries—the bare idea of which would be as distasteful to me, as it would be contrary to my views—I only use it, as I would

have others use it; namely, as the best medium for putting into practice the remedies essential to the cure of this vertebral disease.

Having determined upon placing the patient in the recumbent posture, and adopting the prone as the most desirable one, it only remains to insist upon the absolute necessity of maintaining this position for a very long period, for though a few weeks may be productive of considerable benefit, it is time alone that can bring about recovery.

In the majority of cases I am in the habit of enjoining such entire rest, as to forbid the patients moving from the couch for any purpose whatever, having such additional apparatus fixed to the couch as will permit of his passing the evacuations, whilst reclining in the same position: frequently, more particularly in the case of young children, it will be found necessary to adopt slightly coercive measures, with a view to ensuring perfect tranquility. This may be done by means of a broad strap, or bandage, passed round the body, but so arranged as to prevent the possibility of pressure upon the seat of disease.

Great benefit will attend the guarded employment of counter-irritation, applied to either side of the projecting angle, but not immediately upon it: this may be done by means of the common blister occasionally repeated, few cases occurring where this agent will not prove more beneficial than the



more violent remedies—such as setons, issues, moxas, &c. It must not be concluded, however, but that instances do occasionally occur, where a recourse to these extreme measures will be indicated; on the contrary, when the emp. lyttæ fails to produce the desired effects, then it is judicious to make trial of the other agents, selecting probably the common caustic issue as the most likely to prove efficacious.

I must admit that I am somewhat prepossessed in favour of issues in severe cases, having often derived advantage from them when all other means had failed; and I believe that, in very many instances, their employment is imperatively demanded—the patient, who is daily getting worse and suffering from excessive pain, beginning to improve the moment a free discharge is by this means established.

Upon rare occasions local depletion, either by means of cupping or leeches, may be resorted to, but such a course should be deferred as long as possible, since it tends still more to weaken a patient already too much debilitated—indeed caries of the spine is essentially a disease of constitutional enervation—and, as a general rule, much more benefit will attend a tonic than an antiphlogistic plan of treatment; and the only cases where the abstraction of blood is indicated, are in such as are suffering from a degree of pain more violent than

ordinary, and more difficult to be removed by other means.

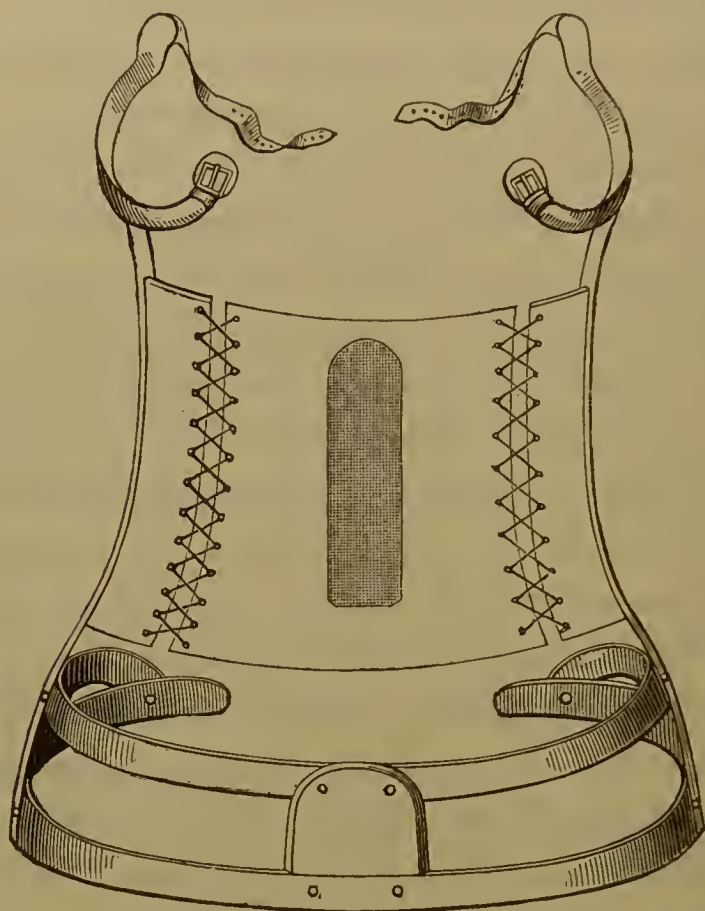
It is impossible to make mention of the variety of trifling circumstances that may add to the comfort and improvement of each particular case, such as a slight alteration of position, a judicious exhibition or withdrawal of any especial remedy—these matters must obviously depend upon different peculiarities, and it is the duty of the surgeon, who has charge of the case to regulate such details.

Since we have seen that the predisposing causes of caries of the spine have their origin in such things as tend to impair the healthy tone of the general system, it becomes of very primary importance to aim at the restoration of the vitiated or debilitated functions, before we can hope for any considerable amendment in the local disease: hence it is advisable, at the outset, to give occasional alterative doses of hydrarg. c. cretæ, combined with pulv. rhæi. or pulv. scam. co.; and in some cases even calomel may be useful. When the functions of the alimentary canal have been brought into a healthy condition, and the various secretions are natural, then the least stimulating tonics should be given: for this purpose I generally employ the various preparations of iron, such as the tr. ferri, sesquichloridi: the ferri carb., or the citrate of iron—the latter of which is a good form for children. The different kinds of bark, either alone

or in combination with the dilute mineral acids, sarsaparilla and zinc are not without their uses; but perhaps the very best remedy that can be resorted to, and one deserving a fair trial in every case, is the cod-liver oil, which appears to exert an especial influence over the disease, when it occurs, as it generally does, in combination with scrofula. Occasionally I have administered the preparations of iodine, the iodide of potass, &c.; but I have never found them produce results, that were not equally gained by steady perseverance in the oil. It is obvious that these, or any other remedies, must be long persevered in, in order to ensure any permanent degree of advantage; but it is equally true, and very satisfactory to know, that by unremitting attention, added to a patient endurance of the recumbent posture, so indispensable to the success of any adjuncts that are employed—there is very good hope for even the most afflicted of patients.

As already stated, the cure of the disease consists in favouring the occurrence of ankylosis—a process that can only be perfected by time and strict adherence to the rules that have been laid down for the patient's guidance. When there are pretty clear evidences that this state of bony adhesion is far advanced, the invalid may be permitted to move about occasionally—by means of crutches at first—

and afterwards with the aid of an instrument similar to that here represented; but the occasional



use of the prone couch should be continued for a very considerable period. Sitting, the worst of all possible positions, should be carefully avoided; and the spine should be secured from the contingency of blows or violent concussions, for, in the most satisfactory cases, a relapse is ever impending.

By degrees the power of moving about will so increase, that the necessity of lying down during



the day, is imperceptibly diminished, until at length it becomes totally unnecessary: and as regards tolerable strength, and a fair share of health, the patient is well; but the projecting angle, the product of the diseased action, remains.

Not unfrequently the surgeon is called upon to give his opinion as to the curability of this acute and disfiguring angle in the spine. What should he say? The answer must depend very much upon the situation, degree, and general character of the projection—the constitution, and present condition of the patient—the length of time the deformity has existed—and the previous history of the case.

Perhaps there is hardly an instance in which the patient's figure is not susceptible of such an amount of benefit, as to reward him for any steps he may take to bring it about; but this improvement is not to be procured by the dangerous practice of attempting to exert any, the slightest, influence upon the angle itself—a circumstance that will appear more clearly in the sequel.

With a view to obtain the desired amount of benefit, the patient should recline in the prone position, whenever not taking exercise: he should never move about without the aid of the instrument before alluded to, and he should be put under such a course of tonics, and general regimen, as shall tend to promote an improved state of health.

Whilst the patient is taking exercise a very light weight may be placed on the top of the head, which will produce benefit, from the effort that is made by the muscles of the back to maintain the body in the erect position — all other species of exercise, all pressure upon the projection, and any attempt at mechanical extension, must be attended with imminent danger.

By adherence to such gentle measures as the foregoing, the size of the angle will undergo considerable diminution—not from any change in the parts that have been involved in the disease, but simply from the restoration of elasticity in the intervertebral fibro-cartilages, situated above and below the anchylosed vertebræ; and if we can succeed in restoring such an amount of muscular energy, as to enable the patient to hold himself erect, the protruding angle, if in the lower dorsal or lumbar region, will fall into the natural concavity of the back; and when habited in a loose dress it may be scarcely perceptible.

This is the limit to which beneficial results can extend; nothing beyond it can be obtained, or should be anticipated. A certain amount of deformity must always remain, despite any efforts that are made to remove it; and those who promise cures, and entire straightenings, and attempt by any means to produce such effects are mischievous

and unprincipled charlatans, alike enemies to themselves, and dangerous to the community at large.

I append the two following cases for the purpose of rendering more clear the circumstances, that I have endeavoured to point out in the foregoing pages.

## CASE IV.

Martha Driffield, aged 8 years, 19, Frederick Street, Hampstead Road, the child of tolerably healthy parents; herself, however, giving clear evidence of a strumous tendency.

When two years of age, the child met with an accident, falling from the arms of a girl who was nursing her: no inconvenience or injury appeared to have been occasioned by it, until in about seven or eight weeks she began to manifest symptoms of diseased vertebræ. She was taken to a medical gentleman, who gave her medicine, and directed her to lie down, the effect of which was materially to stay the progress of the disease; hence, at the age of four years, we find that it had not made any very serious ravages. About this period she was attacked with hooping-cough, which not only rendered her very weak, but also appeared to call into a state of activity the latent disease of the spine, which now assumed a most alarming character. The pain was occasionally very severe, and a considerable projection was soon established. Other consequences followed also: she shortly became paralysed, losing the use of the lower-half of the body; her health began to give way, and she grew restless and unable to sleep at night.



In May, 1846, she was admitted as a patient of the "Hospital for Distortions," Portland Road, and was then labouring under the following symptoms :

There was a very considerable angular projection of the spine, involving the vertebræ, from the third to the eighth dorsal inclusive—the spinous process of the fifth being the most prominent one. The back was greatly curved; the angles of the ribs protruded unnaturally; the scapulæ were elevated, and the neck was deeply sunken between them. Anteriorly the chest was much deformed, being narrow and compressed from side to side; the sternum was excessively prominent, and the cartilages of the true ribs were forced from their natural positions.

The child could just stand; but, in order to do so, was compelled to rest her hands upon her knees, from which habit the body had become almost doubled together, so that it was with difficulty that the anterior portion of the abdominal walls could be discovered. The contents of the thoracic cavity, the viscera of the abdomen, were subjected to an injurious degree of pressure; the several functions of digestion, respiration, circulation, and nutrition were impaired; the bowels were torpid; and she could not move across the room, without suffering such a degree of shortness of breath, as almost to amount to suffocation.

Upon percussing over the spinous processes of

the diseased vertebræ—upon causing the child to step from a stool—or, upon making her cough—the greatest amount of pain was induced: indeed, she screamed out with agony, too clearly showing the active stage of the carious condition.

In getting the child under treatment, the first step adopted was to place her upon an accurately fitted prone couch, giving the mother injunctions, at the same time, to avoid her removal from it, even for a single instant. Active counter-irritation, by means of blisters, was steadily persevered in for some considerable period—some of them being kept open for a short time, and others being applied as soon as the old ones were allowed to heal up. The muriated tincture, the citrate, the carbonate of iron, cod-liver oil, and preparations of iodine, were administered: the bowels were brought into a healthy condition. She never moved from her prone position for the first three months; measures were taken to secure to the diseased portion of the column the most perfect state of repose; and her diet was rigidly superintended.

In a comparatively short space of time this treatment began to tell upon the local disease, and also upon the system generally. The child daily improved; her spirits, her health, her strength underwent a most beneficial change. She gradually lost the severe pain in the back; she became enabled to sleep at night, and during the day, tranquilly

and undisturbedly. The projection also, which hitherto had suffered daily augmentation, decreased in size, and the angle became less acute. Occasionally the child suffered from a slight relapse; but nothing of any importance occurred to retard her progress. When the return of pain, or uneasiness in the situation of the diseased bones, indicated a fresh invasion of inflammatory action, the counter-irritation was resorted to, and the symptoms speedily disappeared.

In the course of a few months she could walk about, holding the body in the erect posture; but any attempt to take active exercise was as yet strictly prohibited. The use of the couch was still steadily persevered in, and due care was exercised to prevent the return of the disease. Long after the child ceased to be visited regularly, she attended at the Hospital at intervals, so that the progress of her case might be watched, and any symptoms of a relapse met at the outset. All went on favourably, however; no untoward event supervened; the child became strong, upright, and healthy, and could walk about very well. She was ultimately discharged cured.

During the summer of 1848 she was again brought to the Hospital, not however in consequence of any return of pain or disease in the back, but on account of the mother having noticed a small swelling in the right groin. There was very

little difficulty in diagnosing the true nature of this tumor, which it is needless to say was a psoas abscess; but from certain phenomena that occurred in connection with this collection of pus, I am inclined to believe that caries was not in its active stage when this swelling made its appearance, but that the matter had been formed long previously, when the disease of the spine was at its height, and that instead of becoming absorbed, it had gradually found its way down the course of the psoas magnus muscle, ultimately pointing in the femoral region. This opinion is materially strengthened by a consideration of the subsequent circumstances in connection with the tumor. The abscess was opened, and continued to discharge for the space of four to five weeks, when the sac healing up from the bottom, the wound closed, and no symptom of the formation of pus has again manifested itself.

At the present time the child is quite capable of taking considerable exercise, and enjoys even a robust state of health. True it is, that a considerable angular projection still remains; but it is so much diminished, and from the muscles of the back being strengthened so that the child can hold herself perfectly upright, it so sinks into the natural hollow of the back, that when dressed it is really almost imperceptible.



## CASE V.

Hannah Wood, æt. 8 years, 1, Macdonald's Buildings, Spray's Buildings, Woolwich, a healthy, and even robust looking child, her parents being both strong and of sound constitution.

Towards the close of 1846, her mother says that the child was attacked with a fever, which left her extremely weak, but that she cannot remember her having received any fall or blow likely to injure the spine. Soon after her recovery from the fever the child began to complain of pain in the back, especially upon moving about, but it was not until 1849, that her mother first noticed a projection of the spine; and at this period, she says, that she was induced to look at the child's back, in consequence of her being liable to call out suddenly with a violent paroxysm of pain in the loins. The angle not only rapidly increased in size, but the child's health was giving way, and her sufferings were daily augmenting. She was taken to a medical gentleman, who ordered her to lie down constantly in the supine position in bed, and to have leeches applied to the seat of disease: added to this, he directed her to take various tonic medicines and strengthening diet.

Still continuing to get worse, she applied to the

“Hospital for Distortions,” Portland Road, in April, 1850; and was admitted as an in-patient. At this time her health was pretty good, but she complained very bitterly of pain in the back; which however was not constant, but intermitting, coming on in violent paroxysms, and being subject to great exacerbation, upon attempting either to move or stoop. She screamed out violently at night, and was very restless. Percussion over the seat of disease occasioned much suffering, as did also the occurrence of hiccough or sneezing. There were no signs either of paralysis or the formation of pus.

Upon making examination of the spine, I found a very prominent angle which involved the fifth, sixth, seventh, and eighth, dorsal vertebræ, the spinous process of the sixth being the most prominent. The thorax was flattened from side to side, respiration was impeded, and the heart pulsed irregularly.

No sooner had the child been placed in the prone position for a few days than a very visible abatement of the symptoms arose; the intense pain in the back decreased, she ceased to scream out at night but now rested tranquilly; the breathing became easy and natural, the appetite improved, and the heart ceased to beat in an interrupted manner.

Measures were taken to insure the immobility of the spine; counter-irritation was persevered in; the child took the cod-liver oil daily, and occasional

doses of grey-powder and rhubarb were administered.

When the pain in the spine had almost subsided, I directed the nurse to rub the back with a preparation of iodine, taking care to avoid pressure upon the angular portion of the diseased projection. At the expiration of about six months, the child was comparatively restored; and when she had had an instrument prepared, similar to the one represented at page 150, and worn it for the space of an hour or so daily, for three or four weeks, she was discharged essentially well. The child has since been brought to the Hospital for examination, and there is no sign of any return of the disease; in fact, I consider her case to be one of a highly satisfactory nature.

## CHAPTER V.

### PARALYSIS PROCEEDING FROM DISEASE OF THE SPINE.

WHEN angular projection is in its active or carious stage it frequently induces two very serious complications; namely, paralysis, and abscess: affections not necessarily combined, but on the contrary generally existing singly. In this chapter I purpose to treat of the former disease.

The actual *degree* of the curvature appears to bear no relation to the presence, or absence, of paralysis; for, whilst it frequently happens that the loss of power and sensation in the limbs is complete, where the deformity involves only one or two of the vertebræ, so, on the other hand, may four or five be implicated, without giving rise to a symptom of the affection. It is evident, therefore, that we must look to some other cause in connection with caries, than the actual *extent* to which that disease has proceeded—an investigation we will enter upon very shortly.

The condition of the parts, seized with paralysis from the effect of diseased spine, differs from that of ordinary palsy—the flabby, degenerated, softened state of the muscular tissue is less apparent, and



the extreme laxity of the ligamentous connections of the joints is not so readily recognized; but, on the contrary, these latter parts are preternaturally stiffened and rigid, and the muscles maintain their wonted feel to the touch. Nor do the limbs necessarily suffer a diminution of bulk.

Most frequently the paralysis is confined to the lower half of the body, that is to say, to the muscles of the lower extremities and the abdomen; the sphincters, and the pelvic viscera; but more rarely it affects also the upper limbs; the respiratory organs or rather the muscles in connection with them; and, in extreme cases, where the diseased action is high up, the tongue, the speech, and the function of deglutition are impaired.

When the disease is far advanced, both sensation and motion are either entirely lost or materially curtailed; but the last-named is always the first to feel the morbid influence. Various degrees of numbness, and occasional difficulty of motion, are suffered prior to the total loss of either power; but, in some cases, total immobility supervenes much more rapidly than in others. When the extreme length of the disease is arrived at, the patient is placed in the most pitiable of all conceivable conditions, having just energy enough remaining to appreciate the horror of his malady, without sufficient vital power to make a single ordinary effort to alleviate his sufferings.

I have had opportunities of witnessing paralysis resulting from caries of the spine, where the morbid action has occupied all portions of the column, from the first cervical to the first lumbar vertebræ; but the situation that most generally gives rise to the complaint is where the caries is located between the fourth dorsal and the fourth cervical vertebræ. It has yet to be explained why this should be the case, but the fact is so well ascertained, as to point out a valuable field of investigation; and, as a step in the enquiry, I would suggest the following circumstances as probably exerting an influence in the production of this peculiarity.

With but very few exceptions the spinal cord terminates opposite the body of the first lumbar vertebra, and consequently occupies but little more than two-thirds of the whole length of the spinal canal. From this circumstance, then, we may at once derive an explanation why paraplegia should rarely or never occur in connection with disease of the lumbar vertebræ; for clearly such a condition could not be induced unless pressure were applied directly to the substance of the cord itself; hence we have only to consider the disease as it occurs in the dorsal or cervical regions, attempting to discover why it should so much more frequently attend upon caries of the upper, than the central third of the spinal column. And surely it is not a very difficult point to explain? In the first place, in

examining the canal itself, we find that its diameter is smaller in that portion, included between the fourth dorsal and third cervical vertebræ, than in any other part of its extent. The bodies of the upper dorsal vertebræ, also, are much less in size, than are the lower ones; consequently the effects of disease, that is situated in this portion of the column, are much more readily communicated to the cord, than when the inferior part is the situation attacked by caries. Looking now to the natural curves of the spine, we find that the column projects backwards in the situations of the three or four upper dorsal and two lower cervical vertebræ; hence, when angular projection manifests itself in that part, this outward bow of the spine is materially increased, and a greater amount of traction is thus exerted upon the substance of the medulla spinalis. Lower down in the spine precisely the reverse is the case, for the inferior dorsal vertebræ are involved in a natural curve, the convexity of which looks in an opposite direction to that at the upper portion: hence, when caries is located in this latter situation, and when angular projection supervenes, its effect is but to lessen this anterior inflection, and thus drawing the spine into a more perpendicular direction, the traction on the cord is diminished rather than augmented.

Having pointed out these peculiarities in the spinal canal, it now becomes necessary to examine

the cord itself, in order to discover if it presents any phenomena likely to illustrate the point at issue; namely, the greater frequency of paralysis from disease in the upper, than the middle third of the vertebral column.

In examining the medulla spinalis of an adult, it is observed that its size and shape is not uniform in its whole extent, but that it exhibits two well marked and distinct enlargements: the first of these, which is much the larger and more extensive of the two, reaches from the first, or sometimes the second, dorsal vertebra to the third cervical, and its greatest diameter is from side to side. The other is situated opposite the last dorsal vertebra, its greatest diameter is from before backwards; and, according to Foville, is mainly owing to an increase in bulk of the anterior region of the cord. Now looking to this peculiarity, we may conclude, that disease in the neighbourhood of this cervical enlargement, is much more likely to produce pressure on the cord, and consequent paralysis, owing to the greater amount of the medullary mass in this situation, than when the same amount of disease is going on around that portion of the cord, that is not included in this cervical enlargement.

Upon examining the coverings of the cord, there does not appear to be any peculiarity that could throw light upon the subject, until we come to the arachnoid, when we find that this membrane is cou-



nected to the medulla spinalis—very loosely it is true—by slender filaments of fibro-cellular tissue, and that these filaments are, by far, the most numerous and intersected in the cervical and upper dorsal vertebræ than elsewhere; and that numerous small vessels ramify in all directions in this areolar tissue, so that in case of any inflammatory action being lighted up, it might readily be supposed to rage more violently here than in other parts of the spine. The spinal veins, too, have all a tendency to increase in size as they ascend the column, a circumstance that is especially well-marked in the case of the *venæ medulli spinales*, which are much larger about the upper dorsal and lower cervical vertebræ than in any other situation.

From the consideration of these several circumstances it would appear, that the reasons why paralysis should be more liable to occur in connection with disease of the upper parts of the vertebral column, than when the morbid action is situated lower down, may be briefly stated under the following heads —

First, The smaller diameter and posterior curve of the canal at its upper part.

Secondly, The lesser size of the bodies of the vertebræ in this situation, which are thus more speedily consumed by disease, and consequently more prone to impart a morbid influence to the medulla spinalis.

Thirdly, The cervical enlargement of the cord itself renders it more liable to receive a morbid impression from neighbouring disease, owing to the more extended surface that it here presents.

Fourthly, The interlacement of the areolar tissue, and the reticulated arrangement of the vessels that ramify in it at the cervico-dorsal portion of the arachnoid membrane.

Lastly, The increasing size of the spinal veins as they ascend the column, may each in their turn favour the occurrence of paralysis from pressure on the spinal cord, from such an amount of caries in this situation, as did it arise lower down, would be unequal to the production of such severe consequences.

There may be other and more potent reasons of account for the peculiarity that I have attempted to throw some light upon; but, in the absence of these, and with a conviction of the important nature of the enquiry, I have ventured to advance the foregoing circumstances as possibly bearing upon the subject in question.

Having now mentioned the most frequent seat of the disease, and having also attempted to explain why it should arise from disease of the spine in one situation more than another, I will at once proceed to describe the symptoms that characterise the affection.

THE SYMPTOMS. — These are so obvious as to require but very little explanation. The patient is labouring under a carious condition of the vertebral column; and, by degrees, he begins to feel numbness in one or both feet, which gradually extends up the legs. He cannot walk so strongly, or so far, as formerly; he is prone to trip over the slightest unevenness in the ground; one leg drags after him, or at least he feels difficulty in advancing it; the urine, or fæces, or possibly both, cannot be retained for the customary period; probably respiration becomes impeded; and numbness in the arms may supervene. The patient complains of tingling in the limbs, and says that they often “die away,” or are “asleep.” This failing condition of the motor and sensory fibres of the nerves suffers daily augmentation; and, in a short time, the disease manifests itself beyond all power of mistake.

When the affection has fully established itself, the lower extremities, and probably the upper also, are almost in a lifeless condition; they are subject to no voluntary motion, and probably totally insensible to the contact of any external agent, however harshly applied; the alvine evacuations, and the urine, pass without the patient’s consciousness; the linen and the bed-clothes are constantly saturated; the limbs are cold, and usually agitated by the most violent and rigid spasms, which contort them into the most unnatural positions; the breath-

ing is hurried and difficult; and, by degrees, the sufferer becomes a burden to himself, and a melancholy spectacle of human infirmity to those around him.

THE CAUSES. — The immediate cause of this serious malady is very clearly the diseased condition of the spine; but, since we have seen that it does not arise from the mere presence of the angular projection, it remains to discover to what peculiar circumstance, or combination of circumstances, its origin is really due.

It appears needless to say, that the affection is dependent upon pressure applied to the substance of the spinal cord, which may be occasioned through the instrumentality of several different agents. Thus, in the first instance, it is very probably the result of extreme congestion in the numerous veins that are contained in the vertebræ, as well as in the spinal canal: at a later stage, when the body has begun to fall forwards, and undue pressure is made upon the anterior portions of the intervertebral cartilages, it is not improbable that they may be forced slightly in that direction, where the least opposition is offered to them; and as this is directly backwards, so they may sufficiently encroach upon the medullary canal to produce pressure upon its important contents. At a still later period, the inflammatory action is propa-



gated to the theca vertebralis, as well as to the sheaths of the nerves as they pass out of the various foramina. The disease still going on, pus is formed, which above all things is the most calculated to exert pressure upon the spinal marrow, especially where the patient is confined to the supine position, when it will necessarily gravitate backwards towards the vertebral canal. As mentioned, when speaking of caries, it is wonderful how much disease may be going on without interfering with the actual continuity of the canal, the affection appearing to attack the bodies of the vertebræ only, and never involving the processes.

Two or more of the causes above-mentioned may be coexistent, but any single one is quite equal to the production of the paralysed condition; and it should be observed, that they all — but more especially the pressure induced by the presence of pus, or the congested state of the blood, in the spinal veins — find great accession from the circumstance of the patient being usually destined to lie upon his back — a position that, during disease, is quite sufficient in itself, to produce such an impression upon the spinal cord, as to originate paralysis.

THE EFFECTS. — These have been sufficiently noticed, when speaking of the symptoms of the complaint; and it is only necessary to mention, that they are of a transient and temporary nature,

always subsiding completely when the disease is arrested, and leading to no extensive pathological changes; unless, indeed, the disease remains uncontrolled till the upper half of the body becomes implicated, when death generally terminates the patient's sufferings.

THE TREATMENT.—The first step to take is to change the patient from the supine to the prone position, which alone will do much towards his recovery, for in addition to the great increase of comfort that is afforded him by this change, he is placed in such a posture as shall occasion any fluid agent that is making pressure upon the cord, at once to change its situation, from the simple circumstance of gravitation. The all-important indication then, is to get the patient upon a prone couch accurately adapted to the peculiarity of his case, and the situation of the diseased action, and so contrived as to permit of his passing the natural evacuations, without the necessity of moving. Upon this he must remain for a certain period without the interruption of the slightest motion; and, whilst in this position, such treatment must be employed, as will tend to alleviate the morbid affection of the spine, and the consequent paralysis.

Repeated application of blisters should be made to the seat of disease, first to one, and then the other side of the spinous processes; and, occa-

sionally, benefit will be derived from dressing them with the cerat sabinæ, or some such preparation, with a view to procuring a more copious discharge.

In extreme cases, where blisters fail, issues may be resorted to with decided advantage: they should not be kept open for a very lengthened period, as such a proceeding tends to debilitate the patient; but, if necessary, they may be healed up, and fresh ones made. The extremities should be kept warm, and frequently rubbed, whilst the cramps, if very violent, should be gently controlled.

As to constitutional measures, occasional doses of mercury, so as to maintain an active state of the liver, and general function of digestion; the use of the lighter tonics, as recommended in the treatment of caries; and a careful regulation of the diet, will be all that is requisite to the well-doing of the patient.

By steady perseverance in such a plan of treatment, provided the symptoms are carefully watched, and either combated or encouraged as the case may be, restoration is, humanly speaking, certain to follow. I can scarcely recal an instance of the many that I have been instrumental in treating upon this principle, where I have failed to bring about recovery. It is very true that the period, necessary for inducing such a desirable consummation, is subject to the widest variation; but I never cease to look with confidence for ultimate

success, because the symptoms of mentamend are long deferred; on the contrary, I feel a conviction of the favourable issue of the treatment, which no adverse circumstance is sufficiently potent to dispel. I am now attending a young gentleman, who furnished ample opportunity for despair, insomuch as he continued to resist the efficacy of the remedial agents for a very long time after he came under my care; but, nothing daunted on this account, I continued to watch his progress with anxious interest, and I have now the gratification of feeling, that he can get off his couch and move across the room without any assistance.

The order in which improvement manifests itself is usually the following:—

In the first instance, the water can be retained for a short period; the patient acquires some knowledge of the occurrence of the alvine evacuations; he feels a tingling, burning sensation in the toes and calves of the legs; respiration becomes more natural; the general health improves; his spirits regain their wonted vivacity; and he loses the spasmodic muscular contraction. This satisfactory progress is daily augmented. In the course of a longer or shorter period, he walks without having suffered any material injury from the duration of the attack.

When such a degree of power, has been gained as to enable the patient to walk, it should be only



permitted under the most careful restrictions, and for some considerable period with the aid of crutches; and all those precautionary measures should be strictly enforced that were recommended in the disease last spoken of \*.

Occasionally cases may arise, which require some addition to the treatment I have mentioned; but they are few, and exceptions to the general rule. I may add, however, that I have frequently employed galvanism, perhaps with success: but such agents as these, together with any others which may merit a trial, must obviously be left to the selection of the surgeon who is in charge of the case.

I feel considerable pleasure in being enabled to subjoin the following cases of paralysis, that have recovered from the employment of similar treatment to that I have attempted to illustrate.

\* Much has been said lately of the advantage to be derived from submitting paralysed limbs to the influence of muscular exercise; and, although I am not prepared to go the whole length with those who so strongly recommend this practice, still I am anxious to observe, that there are certain cases, in which I not only hold it to be highly serviceable, but in which also I invariably make use of it; and, I must say, with extremely gratifying results.

## CASE VI.

Edward Hill, æt. 11 years, 2, Wilmington Place, Margaret Street, Bagnigge Wells Road, a thin spare-looking boy, the child of strumous parents.

Five years ago he fell from a loft, down some fifteen or sixteen steps into a shop, and upon being picked up, did not appear to have sustained any injury beyond that of some superficial bruises. At no very distant period, however, he began to complain of weakness and exhaustion, upon taking the slightest exercise; he daily lost flesh, and grew restless, particularly at night, when he frequently started out of his sleep, screaming violently. At this time the back never underwent an examination, so that we cannot discover whether derangement of this important part originated the above symptoms. He became an out-patient of St. Bartholomew's Hospital, where he was directed to attend once a week. A variety of tonic medicines were given him, and in the space of a few weeks he had gained considerable strength. Still the mother says, that the lower limbs continued weaker than natural; and, upon walking, the boy was observed to stumble over the slightest irregularity in the ground. Upon washing him one day, she found that he had a "growing out" upon the upper part of his back,

which occasioned him much pain when pressed upon.

In this condition the boy continued, until about August, 1849, when he was attacked with typhus fever. He was recovering from this malady, when upon going into the street to play one morning, he fell down, and was kicked in the back by a man who was passing at the time. He told his mother of this circumstance, but no notice was taken of it, until at the expiration of a few days she found the child beginning to droop and get very weak, when she discovered that the projection in the back had become much larger.

The decline of strength was now most rapid: in a few days he was compelled to take to his bed, and in a short time afterwards not only was he completely paralysed, as regarded motion, but had lost all sensation in the lower extremities. The projection of the spine became very conspicuous, and caused the boy the utmost agony when accidentally pressed upon. In this condition he lay for three months, getting worse rather than better.

Early in December, 1849, he was admitted a patient of the "Hospital for Distortions," Portland Road, and I find the following notes of his condition at that time, as recorded by the house-surgeon of that institution.

"Upon visiting the boy, Hill, I found him lying

in bed pale and emaciated to the last degree, with a face expressive of the deepest suffering, and complaining of the most intense throbbing pain in the diseased portion of the spinal column. Upon examining the spine I discovered a very considerable angular projection of the five or six upper dorsal and two lower cervical vertebræ, the spinous process of the second dorsal being particularly prominent. Percussion, or the slightest motion, greatly increased the pain.

“The lower extremities were completely paralysed, both as regarded motion and sensation; violent involuntary spasms occurred at frequent intervals, drawing the legs into the most unnatural positions; all control over the bladder, or rectum, was entirely gone; the arms participated in the general disease, being partially paralysed; respiration was reduced to the lowest state; his general health was impaired; and, for the want of repose, added to the constant pain he experienced, he was almost reduced to a skeleton. Bed-sores were beginning to result from the constant confinement to the same position, and the inner portion of the thighs and nates were excoriated from the constant contact with the vitiated urine.”

No time was lost in placing the boy upon the prone couch, though serious fears were entertained for his ultimate recovery. Some little difficulty was



experienced at first, in getting him accustomed to the change of posture, and owing to his excessive debility great care was necessary to prevent his slipping through our hands. In a comparatively short space of time, he was enabled to lie upon the couch unceasingly; and, when this point had been attained, active remedies were employed to the diseased spine. Counter-irritation constantly re-applied, added to light tonics, a generous but not stimulating diet, and absolute rest upon the couch, were very speedily followed by a change for the better. First, the health began to improve; the violence of the spasmodic action of the muscles abated; the paralysis of the upper extremities entirely disappeared; respiration became easy; the pain in the vertebræ decreased; and soon he began to exercise some degree of control over the sphincters. An uniform progress marked the course of this case; his parents were particularly attentive to the directions given to them, and he daily improved. The remedies were steadily persevered in; and, in June, 1850, not only had he acquired perfect control over the bladder and rectum, and the power of moving his legs, but he could stand; and his mother had the greatest difficulty in keeping him from attempting to walk. Coercive measures were adopted to secure his maintaining the recumbent posture for the present, the cod-liver oil was taken

regularly, friction was employed to the legs, and he rapidly improved. In October he was discharged quite well, and has frequently walked to the Hospital and back since his dismissal; indeed he can take as much active exercise as any other boy of his years—a very slight angle in the spine only remains.

For a detailed account of this very interesting case, see my paper on paralysis, which appeared in the “Medical Times” of March 1st, 1851.

## CASE VII.

Eliza Thatcher, 4 years of age, 4, Charrington Street, Somers Town.

When about two years of age, she was attacked with the measles, and shortly afterwards with the hooping-cough. A little while subsequent to her recovery from these diseases, she was observed to cry out violently in the night, seldom resting above an hour without being disturbed; and, by degrees, she became almost unable to stand, falling down over the slightest uneven surface; respiration assumed a morbid character; a discharge of purulent matter from the ears was established; and ultimately, without any evident cause to which its origin could be assigned, a projection of the upper portion of the spine backwards was discovered. She was put under treatment for these various affections, but did not derive any benefit. In November, 1849, she was admitted as an in-patient of the Hospital for Distortions, Portland Road, and her condition at that time is thus detailed in the case-book of that institution:—

“This child is suffering from a very serious degree of exhaustion and bodily prostration; the body is greatly wasted; the pulse scarcely perceptible; breathing is very hurried and laboured; and her

countenance expresses great depression of the physical powers."

" Upon making examination of the spine, a serious degree of projection was discovered, occupying the situation of the three superior dorsal and two inferior cervical vertebræ. The child screams violently when pressure is made upon these protruding spinous processes; and, in order to avoid the head falling forwards, she habitually supports her chin upon her hands. The whole of the lower portion of the body, from the epigastrium downwards, is entirely paralysed, both as regards sensation and motion; the urine and fæces pass involuntarily; and, saving the efforts that are made to breathe, and the anxious expression of the eye, the child bears the appearance of a corpse. She occasionally cries bitterly with pain in the diseased portion of the column."

Upon the child's admission she was placed upon her chest on a prone couch, from which she never moved for the space of several weeks. Light tonics were administered to her, and her diet was carefully regulated. In the space of about a month, she derived considerable benefit, particularly in her health; respiration became less difficult, and the hectic symptoms disappeared. The paralysed condition of the lower extremities still remained as heretofore, the limbs being frequently violently contracted by the most severe spasms of the muscles;



and it was not until she had continued to be in the prone position for several months, and had a constant succession of blisters applied to the seat of local disease, that any improvement took place in this particular. In course of time symptoms of an ameliorated condition did arise, however; the involuntary action of the muscles subsided; she became enabled to retain the urinary and alvine evacuations; and, shortly, she could detect the contact of any very cold substance applied to the sole of the foot. This improving state continued—steadily it is true, but still unchecked—and, about the month of June, in the present year, she had so far recovered as to be enabled to stand with the assistance of the nurse. Counter-irritation was continued; preparations of iron, quinine, cod-liver oil, and iodine were administered; friction was employed to the paralysed extremities; her health became comparatively reestablished; and she never quitted the prone couch, saving at very brief intervals.

In September, 1850, she was sent to the Seaboard Asylum of the Hospital, at Eastbourne, in Sussex, where from a strictly continuance of the remedies above enumerated, added to the change of air and daily bathing in sea-water, she still more rapidly improved. Upon her return to London, she was readmitted to the Hospital, and the treatment still persevered with; and she at present

remains as an in-patient, but so far recovered as to be able to walk alone, and with her health quite reestablished.

A certain amount of angular projection still remains, but it is considerably diminished in size, and all active symptoms of caries, or actual disease have entirely disappeared.

Since the above was written she has been discharged cured.

## PSOAS ABSCESS

PROCEEDING FROM CARIES OF THE SPINE.

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My original intention was to have introduced into this part of the work, some remarks upon the nature and treatment of abscess, resulting from diseased spine—such as is usually denominated *psoas abscess*; but since this affection is so intimately connected with the subject of scrofulous collections of pus in other situations; and since, too, its treatment is so essentially similar, I prefer reserving my remarks upon this affection, until I come to speak of diseases of the hip and other joints, a task that I shall take an early opportunity of engaging in, as I have devoted considerable attention to these interesting subjects. I shall, therefore, at once go on to the consideration of the next species of spinal deformity.

## CHAPTER VI.

### EXCURVATION OF THE SPINE, OR POSTERIOR CURVATURE.

By this term is implied that affection of the vertebral column, which is familiarly known under the name of "*bow-back*." Its characteristic appearance will be readily recognized from the following description:—

The spinous processes of the vertebræ protrude backwards, as in angular projection; but instead of presenting that acute and prominent angle, which is so distinguishing a mark of that disease, they assume one uniform and general curve, without the protrusion of any one process more prominently than the rest; in fact, the upper two-thirds of the column is so bent, as to furnish the idea of a half-hoop, from which circumstance it has been denominated the "*hooplike curvature*." The head is much advanced, and the shoulders elevated, giving to the patient a peculiarly awkward and ungainly appearance. It very rarely, if ever, occurs, that this affection is accompanied by any actual disease



of the vertebræ, or their intervening cartilages ; it appears to be simply a condition dependent upon a debilitated state of the ligamentous and muscular structures of the spine, which from some circumstance cease to be equal to maintaining the column in the erect position, the consequence of which is, that it yields and falls forwards. This peculiarity at once draws a broad line of distinction between excurvation, and that terrible malady, caries — where we saw that the deformity was solely dependent upon excessive disease and destruction of parts.

Posterior curvature is met with in two very different classes of the community. First, it selects as its victims the infant children of the poor, who, in addition to a weakly constitution, are exposed to such a vitiated atmosphere, and to such an ill-selected system of dieting and nursing, as must tend still more to engender physical debility. A very large number of young children thus afflicted apply at the “Hospital for Distortions,” Portland Road, the majority of whom are under the age of three years. The second class, who suffer from its attack, are young persons of either sex, from the ages of eight or nine years, up to the period of puberty, when the curvature, in place of involving the whole column in one general bend, is generally confined to the upper portion of the dorsal, and lower cervical vertebræ.

THE SYMPTOMS.—These are so evident as barely to require mentioning, for the stooping attitude of the patient, added to the utter inability to preserve the erect position, are features at once so striking and characteristic, as sufficiently to indicate the true nature of the complaint.

THE CAUSES.—These are precisely of a similar nature in the cases of both classes of persons, who are selected as its victims; namely, general debility, which has been in operation for a considerable period, and which so affects the muscles that should support the spine, as to deprive them of the power of fulfilling their destined office—in consequence of which, the body falls forwards, and pressure is made upon the anterior parts of the inter-vertebral cartilages, which becoming cuneiform in shape, render the deformity permanent, or rather persistent, until removed by mechanical measures. Not unfrequently the complaint is combined with a scrofulous tendency. The effects of certain occupations, such for instance as that pursued by compositors, engravers, watchmakers, &c., are calculated to lay the foundation of this disease.

At first the affection is very slight, and easily removed by placing the patient in the supine position; but, gradually, it assumes a more serious character, and unless arrested, will give rise to a great amount of deformity.

THE PATHOLOGICAL CHANGES, AND GENERAL EFFECTS. — The more immediate consequences of the disease are to give to the figure that round-shouldered appearance so characteristic of persons of advanced age; and owing to the great debility which is present, the patient is often found sitting with the arms resting upon the knees. The ribs project backwards, and their angles come more conspicuously into view; the scapulæ are tilted up, and the head appears to be sunken between them, so that the natural length of the neck is concealed.

In those cases, which have afforded an opportunity of *post mortem* examinations, the ligaments connected to the spine, with one exception, have been found stretched, and considerably attenuated, whilst the muscles of the same region were pale, elongated, and much wasted: the anterior portions of the intervertebral cartilages were found considerably reduced in thickness, from the effect of constant pressure, and the anterior common ligament was hypertrophied and unyielding.

In some cases, the patients who suffer from ex-curvedation, complain of a considerable degree of dull aching pain in the region of the spine, a circumstance that would appear to depend upon a certain amount of stretching to which the spinal cord is subjected.

It is not, however, the mere effects that are produced upon the figure by the invasion of this

disease, that demand careful attention ; indeed, there are other and much more important results to which it gives origin, such are the effects it produces upon the contents of the thoracic and abdominal cavities.

In those instances where the mischief is principally confined to the dorsal vertebræ, the thorax is compressed in its direction from above downwards, and consequently its long diameter is reversed from its ordinary position, being now from side to side. In very advanced cases, the sternum yields about its centre, and becomes bent transversely, with its convexity protruding into the cavity of the chest, thus serving still more violently to assist in the pressure that is exerted upon the respiratory organs, and to lay the foundation of disease in these important parts ; hence we find that those persons who have failed to be relieved of this affection during their youth, are particularly liable to suffer from phthisis pulmonalis, and other diseases of the lungs, as also from palpitation and a variety of cardiac complaints.

Owing to the pressure that is exerted upon the lungs and other thoracic viscera, the diaphragm is forced downwards into the abdomen, the contents of which cavity are thus exposed to a great amount of compression, which frequently lays the foundation of disease in the important structures contained in that region ; and, in particular, the



liver and hepatic circulation are very prone to experience the baneful influence. From the same cause also is produced in a great measure that tumid and swollen state of the belly, which is so marked a feature of this affection, though disease of the mesentery also may assist in giving rise to it.

From the existence of such circumstances as those above-mentioned, we should expect to find the sufferers from excurvation of the spine peculiarly liable to the invasion of various diseases; and such is in reality the case, for in these patients we frequently meet with morbid conditions of the various viscera, with the long train of evils to which such affections give rise; and, owing to the approximation that has occurred between the points of origin and insertion of the abdominal muscles, the greatest state of torpidity is found to exist in the condition of the alvine evacuations.

THE TREATMENT.—It is very common for this complaint to be neglected in its early stage, in the vain hope that the unaided efforts of nature will be sufficient to bring about recovery; or, at least, that a mere *stoop* will be the only evil consequent upon its becoming permanent; but when it is considered that it may, and very generally does, originate complaints that, in all probability, will curtail the patient's life, it then becomes the duty of the

surgeon and the parents to give to its treatment and removal such a degree of attention as its importance demands, especially when it is considered that cure will usually await upon the employment of remedies judiciously applied.

The *recumbent position* will be found a most valuable agent in its treatment; and, perhaps, the supine posture is calculated to produce the greatest amount of benefit.

I am in the habit of placing the patient on the back, upon a horizontal plane, somewhat similar to that recommended for lateral curvature by the late Mr. Shaw, to which I add, however, at the upper part an additional plate, or shield, which receives the most prominent part of the excurved vertebræ, so as to allow the head above, and the inferior portion of the trunk below, to hang over slightly, in order to obtain a limited degree of extension, upon the anterior part of the vertebral column, which position serves also to relieve the contents of the thorax and abdomen from the injurious pressure to which they have so long been subjected.

This posture should be maintained at all times when the patient is not walking, or using mechanical exercises. Sitting, or standing still, should be avoided, and riding in a carriage prohibited, unless indeed with the aid of an instrument, to be spoken of hereafter.

At night the same position should be preserved:

or in those cases where this is inadvisable, the invalid should lie flat upon the back on a hard mattress, so as to prevent the body from assuming such an attitude, during the hours of repose, as should tend to throw the spine into a curved posture.

MUSCULAR EXERCISE.—As in the instance of lateral curvature, so in the cure of this affection muscular exercise is preeminently serviceable; and by its agency, not only considerable benefit may be gained, but that benefit will be also rendered of a permanent character. Such varieties of exercise should be selected as are calculated to call into action, and increase the power of, the muscles of the back; thus, for instance, rowing, raising a weight from the ground, without bending the knees, carrying something on the crown of the head, are all excellent in their separate ways, as they tend to bring the spine up into the erect attitude. Much good will also attend the practice of suspending upon the front of the body a weight of some description in the manner that a pedlar carries his wares—a class of persons, by the way, who are remarkably upright, and well-formed, evidently, very mainly, from the effect produced by the habit of suspending their merchandise from the back of the neck and shoulders—whilst, on the other hand, porters, and such persons as those who carry their burdens by means of a belt stretched over the fore-

head, and who have the anterior muscles of the trunk called violently into action, are generally excessively round-shouldered and ill-shapen.

MECHANICAL SUPPORT. — This agent is also of eminent service as an occasional adjunct to other treatment. The instrument that I generally use is somewhat similar to that I have recommended for angular projection, a representation of which will be found at page 150 ; and which, with a slight modification, is quite adequate to accomplish all that can be hoped for from the employment of mechanical support.

As in the instance of lateral curvature, I must beg to express my entire opposition to the advice of those gentlemen, who recommend that rigid instruments should be constantly worn, not only during the day, but even at night, as I cannot conceive how the debility of the muscles is ever to be overcome, whilst we substitute for their action a machine that renders their existence almost unnecessary. No ! I have little hesitation in asserting, that such a practice is not only inefficacious, but also attended with much danger to the patient.

THE SUPERADDED OR ADVENTITIOUS REMEDIES. — Respecting this class of agents little need be said : good diet, active exercise in the open air with the aid of the instrument, attention to the general



health, friction, light tonics, cold bathing, and a due regard to the secretions, will all be measures necessarily useful and deserving of trial.

As regards the TREATMENT OF THE AFFECTION, as it occurs in the infant portion of the community, it may be briefly stated that good air and a careful system of diet, added to cautious nursing, avoiding above all things the sitting posture, and scrupulously persevering in the use of the cod-liver oil, will, in almost every case, bring about restoration to perfect health.

I need only add, that the extent to which the above-mentioned remedies are employed, must be regulated solely by the severity of the case, the constitution of the patient, and such similar circumstances. Generally a few months are sufficient to remove even very severe cases; but, occasionally, a longer period will be required.

I shall conclude this subject by reference to the following cases, in illustration of the beneficial effects of the treatment I have advocated.

## CASE VIII.

Master Ch——t, 9 years of age, a delicate child, the son of respectable parents, who have always resided in a close and confined part of London. The boy was pale and anæmic, and of a lax condition of muscular fibre.

About six years ago the spine was noticed gradually to yield beneath his weight, and the chest was observed to be narrow and contracted—respiration suffering in consequence. He has occasionally had medical advice, but his symptoms increased up to the end of 1849. Early in 1850, his parents consulted me about his case, and subsequently placed him under my care; and, at this period, I found considerable posterior curvature of the spine, the body being proportionately bent forwards. The thorax was greatly distorted, being rendered exceedingly narrow and prominent; the heart pulsated violently against the thoracic walls, and the breathing was distressingly short and difficult. His general health had suffered, and he was now unable and indisposed to move about.

As soon as he came under my care I placed him in the prone position on account of the prominence of the chest, directing his parents to prevent his either sitting or standing still, but giving him per-

mission to walk about for a short period, if he wished to do so. I prescribed for him occasional alteratives, and ultimately the *ol. jecor. aselli*, three times a day. When the chest had become somewhat improved, I changed his position from the prone to the supine, according to the rules laid down in the preceding pages; and by such means I found his progress to be highly gratifying. I found, however, that I could not get beyond a certain point with these measures only; indeed, improvement ceased, until I succeeded in getting him under a vigorous course of gymnastic and calisthenic exercises, when his progress became uniform and very satisfactory. I continued to visit him until July last, when finding that the deformity of the chest had entirely disappeared, and that the excurvation of the spine had so far decreased, as to have become almost imperceptible, I gave up the case, essentially cured, though still slightly debilitated, mainly I believe from the want of change of air. With a view to meeting this necessity, I recommended his removal to the sea-side; but when he was brought to me some few weeks since, I found that my directions had not been followed in this particular: the boy was, however, quite as well as when I relinquished visiting him, and with the aid of the instrument could walk a long distance without experiencing fatigue or other inconvenience.

## CASE IX.

Henry Dodds, æt. 9 years, 34, Milton Street, Dorset Square, was born in London, where he has always resided, excepting at brief intervals. He is a delicate clear-skinned looking boy, with a rachitic tendency of the osseous system.

About three years ago his strength began to fail, the muscular system suffered emaciation, the breathing became difficult, and he complained of violent palpitation of the heart. These symptoms increasing, in a very short time he was unable to hold himself erectly, and consequently walked about with the back bowed, and his hands resting on his knees. A few weeks subsequently to this period, it was discovered that the spine projected backwards, and that the thorax was deformed. Having sought medical advice, he was ordered to lie in the supine position, and to take tonic medicines: failing to get relief, however, he applied to the "Hospital for Distortions," Portland Road, and was admitted as an out-patient in May, 1850.

At this period the vertebral column presented an appearance of excurvation in a very marked degree; the six upper dorsal and two lower cervical vertebræ were involved in the general bow or hoop, the head was thrust forward, and the whole trunk



was observed to be bent and doubled together. Occasionally the boy complained of a dull wearing pain in the spine, but not of so intense a nature as to indicate the presence of any active disease. Examining the anterior portion of the trunk, I found the thorax greatly compressed laterally, the sternum protruded forward, and he was what is termed "pigeon breasted:" the long diameter of the thoracic cavity was changed, being now in the antero-posterior direction, instead of from side to side. The breathing was much disturbed; the countenance was anæmic, indicating defective circulation; the boy was weak and debilitated, and incapable of enduring fatigue; and he appeared to be daily sinking into the grave.

As soon as he came under treatment, I ordered him to be placed upon the prone couch, by means of which his chest was very shortly improved, and, to some extent, the excurved condition of the spine derived a beneficial impulse from the same means; but this latter affection did not yield readily to treatment, and I therefore directed the position to be changed occasionally.

This change was attended with some degree of benefit; at intervals he took small doses of hydrarg. c. cretæ, and pulv. rhoi; and the cod-liver oil, in doses of one teaspoonful three times a day, was regularly administered. Under this treatment he steadily improved, gaining strength, and losing the

shortness and difficulty of breathing. The deformed condition of the spine, too, underwent a salutary change, and up to a certain point he progressed most satisfactorily; but finding that improvement ceased short of recovery, and attributing it to the impossibility of procuring gymnastic exercises at home, I advised his coming into the Hospital for a short time. This he did, in September last, and he immediately commenced a system of vigorous exercises. This case was carefully watched by the house-surgeon; and, in a very short period, the boy began to improve most satisfactorily; the excurvation of the spine almost disappeared, the contraction of the chest diminished, he gained strength and became enabled to endure considerable fatigue, and was verging on complete recovery, when an attack of cutaneous disease rendered his dismissal from the Hospital compulsory. Not many days since, however, he presented himself for examination, and I could not discover that he had suffered any relapse, or other evil consequence, from the temporary suspension of active treatment.

## CASE X.

Eliza Gaskin, 3 years old, residing at 36, Cumberland Market, the daughter of a strong athletic life-guardsman.

When about fifteen months of age the child began to walk, and at this time was robust and healthy: very shortly after this period, however, her health declined, she became debilitated, and could not hold herself erectly. These symptoms daily increased, and very shortly she became unable to stand. She was admitted as an out-patient of St. George's Hospital, where she continued to attend for some time, but failed to get relief. In July, 1849, her father's regiment was removed to Windsor, whither he was accompanied by his wife and child. Advice was sought for the latter, and, from the instructions given by the medical gentleman to whom the parents applied, she appears to have derived some degree of benefit; still, however, she remained unable either to walk or stand, with the spine, too, in a very distorted condition.

In the month of August, 1850, she was first brought to the "Hospital for Distortions," Portland Road, and admitted as an out-patient. Her condition, at that time, was one of extreme debility

and emaciation, the functions of respiration and circulation being reduced to the lowest ebb.

Upon making examination of the spine, it was found to project backwards in a very considerable degree; the spinous processes of the sixth, seventh, and eighth dorsal vertebræ were so prominent, as almost to induce the belief of the presence of "angular projection." A more minute investigation, however, clearly established the true nature of the disease, which, it is needless to say, was excurvation of the spine. The limbs were emaciated, and the whole muscular tissue wasted; the breathing was hurried and difficult; the heart pulsated irregularly; great torpidity of the bowels existed; and the countenance was expressive of a much impaired condition of the vital powers. The abdomen was large and tumid, and the extremities always cold.

Upon the child's becoming a patient of the Hospital, she was directed to take the *ol. jecor. aselli*, three times daily; to have the back well sponged every morning with cold salt and water, and to lie upon the floor in the prone position, avoiding sitting, or attempting to stand. The occasional exhibition of small doses of *hydrarg. c. cretæ*; and *pulv. rhoi*; or *pulv. jalap. co.*, was attended with marked benefit; the bowels became regular, the appetite improved, the countenance regained its wonted vivacity, and the child's spirits resumed their natural buoyancy; and from being inanimate.



and averse to motion, it was now with difficulty that she could be kept quiet. The mother was directed to rub the back with a stimulating linament, composed of equal parts of ol. camph. co., and lin. sapon. co., and to pay particular attention to the child's diet, giving her milk at least twice daily, and occasionally beef-tea, avoiding solid food. Strict injunctions were given to maintain the recumbent position, a task, however, that had now become very difficult, inasmuch as the child had acquired the power of sitting up and crawling about the floor.

Upon each occasion that I saw the child, I could detect some marked amount of improvement: by degrees the excurved condition of the spine subsided, the health daily improved, and she gained flesh; indeed the progress of this case was uniform and satisfactory. At the end of about four months, she could stand with the aid of a chair; the muscles of the back had become strong; and no trace of the deformity in the spinal column remained. She has now been discharged only a few days perfectly well, and enabled to run about as well as other children; in fact, the mother says, that she is stronger than at any former period.

## CHAPTER VII.

### INCURVATION OF THE SPINE, OR ANTERIOR CURVATURE.

Fortunately this description of spinal deformity is of all kinds the most uncommon, as it is the most surely disastrous in its ulterior consequences. There does not appear to be any particular class of persons, or any especial age that is predisposed to experience its invasion. In the few instances, which have come under my observation, I have never been enabled to arrive at any satisfactory conclusion touching either of these circumstances.

THE SYMPTOMS.—The peculiar appearance that is presented by persons suffering from this affection is so striking, as to be at once easily recognized, for instead of the natural and graceful curve, which characterises the spine of a well-formed person, we find that the lower dorsal and lumbar vertebræ are thrust forward into the abdominal cavity, thus giving rise to an enormous hollow in the back, which is strikingly peculiar. The occiput is approximated to the sacrum, the integument of the back hangs loosely over the receding spinous process, and the abdominal muscles are rendered tense to the most extreme degree.

THE CAUSES.—This disease appears to originate, either from the loss of balance between the extensor and flexor muscles of the trunk, or from a morbid condition of the various spinal ligaments; from whichever of the two causes it may arise, certain it is, that *post mortem* examinations afford the most undeniable evidence of an atrophied condition of the muscular structures situated upon the posterior parts of the body, whilst those upon the anterior portion are preternaturally strong.

THE PATHOLOGICAL AND GENERAL EFFECTS OF INCURVATION.—The effects produced by incurvation, when present to any considerable degree, are of the gravest and most serious character, and it does not require a great effort of the imagination to discover why they should be so. Extreme pressure is made upon the contents of the abdomen, upon the liver, the spleen, and the viscera generally—the important structures situated in the posterior mediastinum are thrust out of their course, and exposed to a most injurious degree of extension; hence circulation, digestion, nutrition, are severally impaired—the abdominal walls are rendered excessively tense, thus predisposing the patient to the attack of umbilical, as well as the other forms of herniæ—the health is broken up, the patient is subject to great agony, and either from disease of some important organ, or from the effect of stran-

gulated hernia, death shortly puts a period to his sufferings.

The pathological changes, induced by the disease, appear to consist in an altered shape of the intervertebral fibro-cartilages, and general spinous ligaments, a vitiated state of the muscular system of the trunk, and a morbid condition of parts contained in the cavity of the abdomen; the spinal cord, too, has been found diseased, whilst its membranes gave evidence of having suffered from the stretching to which they must have been subjected.

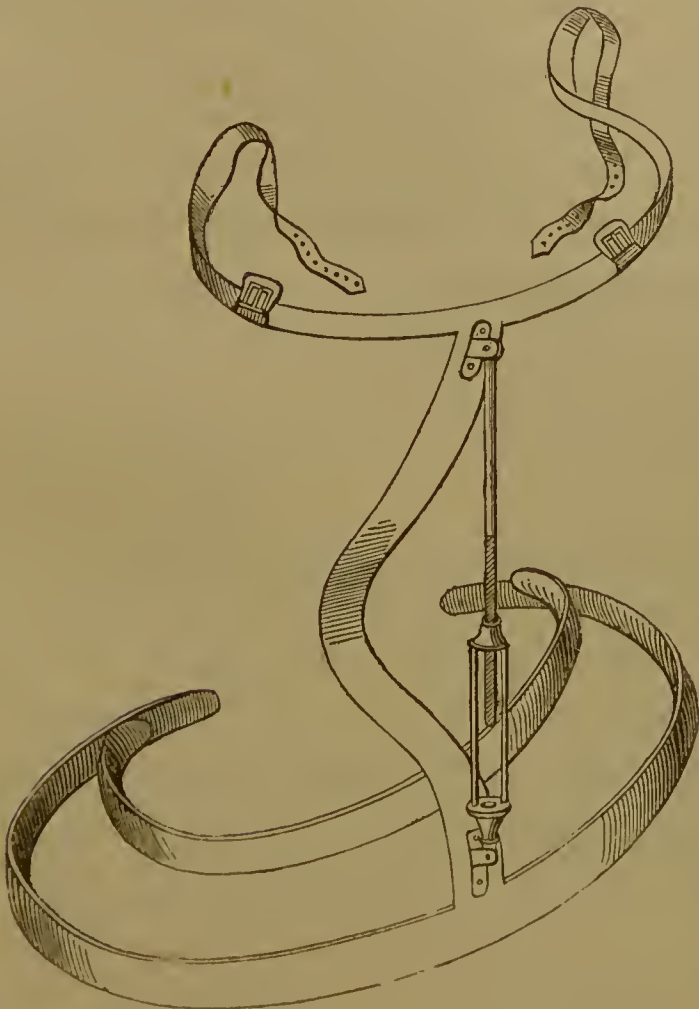
THE TREATMENT.—Patients, who suffer from this disease, should lose no time in getting under treatment, as delay endangers the very continuance of their existence. The recumbent position, especially the prone, is highly essential, and it should be employed in combination with mechanical extension, so procured as to act between the sacrum, and the prominence of the superior ribs and scapulæ: it should necessarily be long continued, in order to produce benefit, and even at night, it should be omitted for a short period only. The patient should sleep in the prone position, on a prone couch, and some measures should be adopted with a view to preventing the possibility of his shifting from it to any other posture.

MUSCULAR EXERCISE.—This agent is less calcu-



lated for the treatment of incurvation, than for that form of spinal distortion last-mentioned: there are, however, those varieties which may prove beneficial, such as to carry a weight upon the back suspended from the forehead, and such other actions, as may be found to produce benefit, should be persevered in.

MECHANICAL SUPPORT.—Considerable advantage may be derived from the use of this adjunct, as, in addition to producing benefit, it also serves to preserve what has been gained by other means. The instrument, represented below, was contrived by



myself for the case of a young gentleman, who came under my care, and I found it to answer every purpose—indeed I attribute to its use much of the alleviation that that patient derived, inasmuch as he was, through its aid, enabled to move about with great comfort, and less fear of sustaining a relapse: moreover it certainly assisted in straightening the spine also, and that, too, in a very marked degree.

THE SUPERADDED REMEDIES.—Friction and cold bathing may be serviceable in some cases, as may also tonic medicine, but it must be confessed that the principle remedies are confinement to the prone position, and occasional recourse to mechanical support; but it is to be regretted that even by such measures, we are unable to save the majority of patients who suffer from this terrible form of spinal disease. The following case is not without interest.

## CASE X.

George Mann, 8 years of age, 12, Uxbridge Street, Notting Hill, was exposed to a serious injury about four or five years ago, from the effects of which he became attacked by disease of the hip-joint. For this affection he was under the advice of several medical gentlemen, and for a long period attended as an out-patient at the North London Hospital. Ultimately he rallied from the active state of the disease, but was left with a very considerably shortened limb. For many months he moved about upon this impaired member, and the mother did not seek advice for him, until she found that his back was growing deformed, when she took him to the Orthopædic and various other institutions, in the hope of getting him benefited: finding, however, that he did not recover from the measures adopted for his restoration, she brought him to the "Hospital for Distortions," Portland Road, in May 1850.

Upon examining the boy, I found that his right leg was much shortened, and the thigh was considerably flexed above the abdomen. There was great contraction of the rectus femoris muscle, and the limb was rotated outwards, indicating a tense condition of the psoas and iliacus. There had evidently been severe disease of the hip-joint; and it

required but little care to discover, that anchylosis had taken place in this situation—a circumstance that rendered it hopeless to attempt any measures for reducing the contraction of the rectus femoris.

Observing that the boy had a peculiar and awkward gait, I desired his mother to show me his back, and upon her doing so, I found that he was suffering from an extreme degree of incurvation of the spine. The whole of the vertebral column, from the first dorsal to the last lumbar vertebræ, were involved in the general inflexion. Upon making the boy stand upright against the wall, I perceived that his shoulders above, and the sacrum below, came into actual contact with it, but that the whole spine between these two points presented the appearance of a considerable arc. The abdominal muscles were rendered excessively tense, and the boy was only easy when the body was bent forwards. He complained of a dull aching pain in the central portion of the spine; and, when in the erect posture, experienced great uneasiness from a sense of dragging and tightness at the groin.

Whatever may have been the primary cause of originating in this boy incurvation of the spine, I entertain but little doubt that the disease was very materially increased by the extreme tensity of the psoas muscle—a condition that had arisen from the long continuance of keeping the thigh in a flexed position during the active stage of coxalgia.



Giving the mother to understand that very little could be done for the relief of the shortened extremity, and pointing out to her that the distortion of the spine was in reality of the greatest moment, I advised her to send the boy into the Hospital to which I am attached. As soon as she did this, I directed that he might be placed upon the prone couch, and have moderate extension applied in the manner recommended in the foregoing pages. In addition to this, I had an instrument prepared for him, by means of which I could keep up a constant traction upon the vertebral column; and, in a short time, I found that some slight degree of benefit had arisen; the extreme tension of the abdominal walls was overcome, he ceased to complain of the pain in the groin, and the wearying sensation in the spine disappeared. Occasionally the prone position was changed for the supine, medicine was given to act upon the bowels, and the mechanical extension was continued. The boy made steady and satisfactory progress, and in July, 1850, was discharged very considerably improved in figure, and what is more to the point, with that affection of the spine arrested, which, had it continued to increase, would in all probability have sacrificed his life.

The shortness of the limb of course remained unchanged.

## CHAPTER VIII.

### RACHITIS, OR RICKETS.

THIS term expresses that peculiar condition of the osseous system, where the earthy particles of a bone have either been so completely removed, as to leave it in such a soft and yielding condition, as to incapacitate it from performing its destined office; or as is more probable, the arteries have never deposited the calcareous matter in its due and natural quantity: the consequences of either of these conditions are similar—the bones are unnaturally yielding, and incapable of resisting the distorting effects of muscular contraction, and resemble more the nature of cartilage than that of true osseous tissue.

In those persons who suffer from rickets, there will usually be found, coexistent—great derangement of the digestive process, and function of nutrition generally—a torpid condition of the bowels—thick urine, which deposits a calcareous sediment—much tumidity of the abdomen, bespeaking disease of the mesentery—enlarged glands and other symptoms, indicating general debility. In addition to

this, there is generally extreme distortion of the various bones, which is indeed the circumstance for which the surgeon is usually consulted.

One remarkable phenomenon in connection with the disease, is the excessive precocity of intellect, which characterises its victims — a circumstance that would seem to result from the premature development of the brain in those who are thus affected, owing clearly to the softened condition of the cranial bones offering less resistance to the rapid increase of the cerebral mass.

Rickets is a disease peculiar to children\*, and is daily met with amongst the infant portion of the poor and needy, who reside in damp, unwholesome localities, and who, above all things, are subjected to the most injudicious system of dieting and nursing. No bone in the body, saving perhaps the os hyoides, but is subject to become attacked by it; hence distortions of the lower and upper limbs, of the trunk, of the cranial, and even of the facial bones, is frequently met with by those engaged in hospital practice. The femur, the tibia, fibula, and bones of the pelvis and tarsus, however, are those which generally give evidence of the morbid condition in the most striking degree, obviously because they are more exposed to those circumstances

\* An analogous affection does occasionally occur in persons of adult age, but it is dependent upon different circumstances, and is called "mollities osseum."

which are particularly calculated to produce distortion.

There is but little doubt that the rachitic condition is intimately connected with a scrofulous habit of body, various circumstances serving to point out their great affinity.

It is by no means my intention, in this place, to enter into a minute description of the true nature of rickets, or the particular condition of the constitution upon which it is dependent; my object, in alluding to the subject, is simply to explain its connection with certain varieties of spinal distortions; and having done so, I must refer such of my readers, as may wish to pursue the matter further, to the excellent works of Portal, Beale, Sir Astley Cooper, &c.

As the bones of the extremities and pelvis are liable to suffer from the effect of rachitis, so also do we find the vertebral column brought within its injurious influence, the result of which is the invasion of deformity in that complicated structure.

This deformity may either assume the character of lateral curvature, or it may partake of the nature of excurvation; more rarely, too, it is found to originate caries, and angular projection; indeed it sometimes happens that the worst cases of this latter disease, occur in persons of a rachitic tendency. Where this is the case, the affection must be combated by similar remedies to those recom-



mended for its treatment, when arising from other causes. For the present purpose, therefore, it is only necessary to point out the particular circumstances that indicate a different method of treatment in those cases of lateral curvature, which result from rickets.

In the treatment of spinal deformity arising from this cause, we must be especially careful to keep in view, that our remedial agents are to be employed upon bones preternaturally softened; and that these must inevitably produce much more serious mischief than that they are intended to rectify, unless they be selected, with an especial regard to this circumstance. Taking this fact into consideration, it must be manifestly improper and barbarous entirely to rely upon, or in many cases even to resort to, the employment of mechanical support in these particular cases; for owing to the pressure that is made by these instruments upon the bones of the pelvis, such an amount of deformity is produced as often leads to the most distressing consequences. There is not an anatomical museum but possesses its specimens of the most ill-shapened pelves, the majority of which have resulted from the effects produced by mechanical instruments; and it is to the fact of ignorant persons having recommended the use of such machines, in the cases of rachitic patients, that must be attributed the evil results which have occasionally

attended even the limited use of well-adjusted instruments, and the consequent disfavour that they have got into. Bearing in mind, then, the importance of partially or entirely banishing from our list of remedies mechanical support, when treating spinal curvatures dependent upon rachitic softening of the bones, it becomes strikingly evident, that no measures can promote the patient's recovery, unless they are subservient to the recumbent posture. The selection between the prone or supine positions must be made according to the rules that have been already laid down in the foregoing pages.

The probability of success will be greatly enhanced, by improving the tone of the general health; hence, from the very outset, we must devote great attention to this important subject, and for this purpose it is proper to recommend good air (by the sea-side if possible), a light nutritious diet, taken at regular intervals, and cold salt-water bathing, which will do much for us; but their good effects must be increased and perfected, as it were, by the judicious exhibition of tonic medicines, such for instance as preparations of iron, sarsaparilla, quinine, and, above all, cod-liver oil, a remedy that appears to be so potent in the contest with this disease, that it is almost deserving the name of a specific. Occasional recourse to friction will also prove of eminent service, and other gentle manipulations may be resorted to, with a view to the restoration of the patient's symmetry, added to

which slight extension may be employed for a short period daily with decided benefit.

When the arteries have been induced to take on a healthy action, and when such an amount of earthy matter has been deposited in the bones, as to enable them to perform their appointed offices, such an amount of exercise should be permitted as is short of fatigue: if possible it should be in the open air, and always with the assistance of an instrument, which will now be incapable of producing mischief by occasional use.

By steady perseverance in such a course of treatment, which must necessarily be continued for a considerable time, we shall very generally have the gratification of finding the patient recover: and it is highly satisfactory to know, that notwithstanding the extreme severity of rachitic deformities, they are not always the most difficult of cure; on the contrary, it is wonderful with what rapidity they are sometimes found to give way to proper treatment.

When recovery has once been induced, no fear need be entertained of the patient again relapsing; for it is a well authenticated fact, that rachitic bones are not only restored to their natural degree of hardness, but that in many instances their texture is rendered even more dense than that of similar bones in other situations, especially upon that portion of them which originally corresponded to the concavities of their curvatures.

## CHAPTER IX.

### SPINAL IRRITATION, OR HYSTERICAL AFFECTIONS OF THE SPINE.

UNDER this title is recognized that peculiar state of the spinal column, and the contents of the vertebral canal, which, though not manifesting itself in any very striking impairment of symmetry, is nevertheless the source of a variety of distressing symptoms, which, until very lately, were either enveloped in mystery, or worse still, attributed to erroneous causes. Careful investigation, however, has led to a salutary change in this respect, and it is now usual to assign to some derangement of the membranes of the spinal cord, those perplexing symptoms that were formerly sunk in that comprehensive and convenient term—"nervous debility."

The most frequent sufferers from this species of spinal affection are young females, from the ages of thirteen to twenty years. I have, however, repeatedly witnessed the invasion of the disease in older women, some of whom have been the mothers of large families.

THE SYMPTOMS.—The symptoms of the complaint



are very various, as well as extremely anomalous; and they can only be said to originate from derangement of the spine, when they coexist with acute pain and great increase of sensibility in that structure. Without attempting to enter into a description of the various phenomena, that are found to occur in each particular case, it will be quite sufficient for all practical purposes to state, that an examination of the spine should be made, when such complaints as the following are brought under notice, particularly when they cannot be assigned to any other especial cause.

Great debility and fatigue, even though little exercise may have been taken—derangement of the digestive organs, and function of menstruation—loss of appetite—shortness of breath—palpitation of the heart—constant headache—giddiness—cold extremities—frequent faintings—hysterical fits—indisposition to motion—fluttering at the chest—constriction at the epigastrium—wakefulness, and anxiety—disturbed dreams—startings in the sleep—despondency—great dislike to the stooping posture—and a variety of others. When such symptoms as these occur, and there is no palpable cause from which they may be supposed to arise, then do I say that an examination of the spine will frequently fix the seat of disease.

There does not appear to be any particular portion of the dorsal or lumbar regions of the spine

which is more subject to become affected by the disease than another; but the cervical region, though occasionally found to be the seat of the morbid condition, is far less susceptible of its attack than the other portions of the column.

In some instances we find, that several of the vertebræ are implicated in the diseased action, whilst in others it is confined to a space equal only to one or two of the bones. In making examination of the spine in a person suffering from spinal irritation, there will generally be experienced but little difficulty in discovering that portion of the column more immediately involved in the morbid action, as a certain degree of swelling and puffiness of the integument will direct the surgeon's attention to the part affected—failing this sign, however, percussion over the various spinous processes rarely fails to indicate the condition of the subjacent parts: occasionally, however, even this test may be employed without eliciting any very striking evidence of disease; in such cases recourse may be had to the plan recommended by Mr. Copeland, who proposes that a hot sponge should be passed down the spine, stating that the patient will flinch, when it is traversing that portion of the column that is suffering from the effects of chronic inflammation or other mischief.

Besides these indications of the disease, the patient will tell you, that she has for a long period,

experienced a sensation of burning heat in the spine, or it may be, a cold shuddering sensation which she likens to the trickling of cold water. In some cases these symptoms assume a most violent form. At the present time I am attending a young lady, in whom vomiting and fainting are produced by even a slight degree of pressure on the dorsal vertebræ.

As we are careful in these cases to bestow upon the spine a cautious examination, so as to discover, if possible, the real cause that is giving so much suffering to the patient, let us be especially scrupulous to avoid falling into the more serious error of at once concluding, that all patients, who experience the symptoms above-mentioned, are the victims of spinal irritation; for, be it remembered, that there are far other circumstances connected with the peculiarities of the female constitution, which are quite equal to the production of such phenomena—such are the various uterine affections, which originate a vitiated condition of the catamenial discharge, and produce that state of hysteria that offers to the medical practitioner so great an amount of difficulty.

In diagnosing the real nature of the affection, therefore, much caution must be exercised: and it is only where an abnormal condition of the vertebral column can be clearly detected, that we should venture to accuse it of giving rise to symptoms,

that may equally be caused by other agency. The various spinal empirics, who exist in different parts of the British dominions, are little scrupulous upon these points; but the first object of medical men, who have at heart the dignity of their noble profession, should be, both by their conduct and their voices, to deal a deadly blow to quackery and its evil consequences. Hundreds of poor females, who have fallen into the hands of unprincipled charlatans, have been sacrificed to a course of the most barbarous treatment applied to the spine, when, in reality, that structure was not at all in fault. It is equally true, however, that the symptoms above enumerated are often allowed to go on, when examination of the spine would, at once, point to the necessary treatment for insuring their removal. It is by careful investigation alone, that a true and accurate diagnosis can be arrived at; and I know of no subject, which is more deserving of deliberate attention, than the one now under consideration, since by judicious treatment, the complete arrestation of the disease may be certainly secured.

THE CAUSES.—In those cases where the disease can really be attributed to some morbid condition of the spinal apparatus, it would appear to originate from a low chronic inflammatory state, either of the membranes of the spinal cord, or the coverings of the nerves as they pass out from the me-



dullary canal—neither of which conditions involve any actual alteration of structure in the parts affected, though they *may exist* in combination with changes both in the conformation and distribution of the component parts of the vertebral column.

Reference need not be made to the general effects produced by the disease, since these have been sufficiently dwelt upon in speaking of its symptoms.

THE TREATMENT.—There are two indications to be attended to in this particular; first, the arrestation and removal of the local disease; and, secondly, the reestablishment of the general health.

The recumbent position — particularly, or I should say exclusively, the prone — is of eminent service, and should be employed in the early treatment of the disease, with but little intermission. Sitting, standing, or excessive exercise, should be studiously avoided. Slight counter-irritation, by means of occasional blisters, may prove beneficial; but their frequent repetition is inadvisable. As a rule, local or general bleeding is injurious, since the tendency of such treatment is to weaken a constitution, the very debility of which has mainly produced the disease we are anxious to cure. Exceptional cases do arise, however, in which recourse to depletion is indicated. As regards setons, issues, moxas, and such severe practices, they may very

advantageously be expunged from the category of remedies that should be employed in these cases.

Much attention should be bestowed upon the subject of the general health—the digestive process should be carefully regulated, and, above all things, the function of menstruation should be brought into its regular and natural condition. Light tonics, nutritious diet, occasional change of air, employment of the mind, and slight exercise, will materially assist the other remedies employed.

Few cases but will speedily give evidence of improvement, if this treatment be persevered in—a fact well illustrated in the first of the following instances, which was one of a severe and aggravated description, and presenting peculiarities not met with in the majority of patients, who suffer from the effects of spinal irritation.

Since writing the foregoing pages on the treatment of spinal irritation, I have made trial, in a very complicated and severe case, of the “*cataplasme galvanique*,” as recommended by M. le Professeur Récamier; and though I forbear to draw any very decided conclusions from the success I obtained through its agency in this single case, still I cannot conclude, without recording my conviction of its great utility in the treatment of this particular form of spinal disease.

## CASE XII.

Amelia Palmer, æt. 17 years, 2, Mary's Place, Wilton Road, Pimlico, a delicate, nervous girl, who has for the most part led a sedentary life.

Up to eleven or twelve years of age she was tolerably healthy, but about this period she was seized with a fit, and fell to the ground. Upon recovering she does not appear to have experienced any very serious consequences from the attack, at least not until some eight or ten weeks afterwards, when she began to experience pain in the spine, which she described as being of a dull, aching character. A second fit supervened upon these symptoms; she again fell—down stairs upon this occasion: the effect of this was to cause exacerbation of the pain in the vertebral column. Percussion, or walking fast, increased the uneasiness; and ultimately she became unable to move without producing great suffering in the diseased portion of the spine.

Seeking medical advice, she was directed to lie upon the sofa in the prone position, and to take cod-liver oil thrice daily. Failing to recover, she applied to the Charing Cross Hospital, and was

admitted as an out-patient. Tonic medicines were prescribed; and, according to her own account, she was directed to be "placed in irons." Not entering very kindly into the spirit of this advice, however, and continuing to get worse, she was advised to get into the "Hospital for Distortions," Portland Road, which she succeeded in doing, in August of the current year.

Upon visiting the Hospital the day after her admission, I found her suffering from an excessive degree of hysterical or nervous irritability. She was timid; and when I asked her to look at me, she did so with a hasty and misgiving glance, instantly fixing her eyes upon the ground again. She was easily moved to tears, or other extreme expression of mental emotion—her countenance was very pale and dejected—respiration was hurried—the heart beat violently—the pulse, notwithstanding, was feeble and small—the bowels were confined—she complained of constant head-ache, more particularly at the vertex, and was subject to attacks of hysterical fits. The function of menstruation was in a most vitiated condition—occasionally she suffered from obstinate amenorrhœa, which it was difficult to overcome; and when, by appropriate remedies, a salutary influence had been produced, it was frequently followed by as severe an attack of menorrhagia. She complained of excessive pain



in the spine, especially towards the lower portion of it, and experienced such an amount of general lassitude and prostration, as to induce her to avoid motion upon every possible occasion. The complexion of the skin, the albuginoid tunic of the eye, a constant pain and tenderness of the right side, indicated derangement of the hepatic circulation, and the function of the liver generally.

Upon examining the vertebral column, I found it to be somewhat universally arched, with the convexity looking posteriorly: the muscles of the back were emaciated, and inadequate to the task of preserving the perpendicularity of the body. On making a forced effort, it is true, that she could draw the trunk upright; but a few seconds only were sufficient to produce an insupportable degree of exhaustion.

Tracing downwards the spinous processes, I could not discover any indication of disease, until I arrived at the situation of the eighth dorsal, from which vertebra to the second lumbar, there was a very palpable amount of tumefaction, which was of a raised and puffy character. Upon employing percussion from the cervical portion downwards, no evidence of morbid action could be detected, until coming to the situation of the swelling: in this region, however, very severe pain was occasioned even upon making slight pressure. If the force

exerted were still more violent, a sensation of nausea and fainting was the result. Upon my desiring her to stoop forwards, she did not appear to experience any great inconvenience; but the attempt to resume the erect attitude was attended with excessive suffering. It was in this region of the spine that the girl habitually complained of the dull aching sensation, with the occasional addition of the burning heat or sense of cold shuddering.

Preparatory to putting the case under treatment, I directed her to be placed upon the prone couch, and to maintain that position as constantly as possible. In a few days she was enabled to rest there entirely. She was then ordered to take occasional doses of pil. hydrarg. with full quantities of decoct. aloë: co. in the morning. Having succeeded in bringing the digestive apparatus into a healthy condition, inducing the regular occurrence of the alvine evacuations, the employment of counter-irritation to the spine was resorted to—a succession of blisters were applied over the seat of disease, forbidding during the administration of such remedies the slightest attempts at motion.

No very long time elapsed before evident signs of improvement began to manifest themselves—the general health and appearance of the countenance underwent a salutary change, the appetite improved, she became less nervous and timid, the pain in the

back greatly diminished, and she gained considerable accession of strength. For a short time she took small doses of zinci sulph. and extract. hyosciami, which tonic was alternated with the muriated tincture of iron, and afterwards it was changed for decoct. cynchonæ, and acid sulph. dil.

Being strongly impressed with the paramount importance of bringing the menstrual function into an ameliorated condition, I ordered her to take those remedies that are especially indicated for producing a salutary influence in derangements of the uterine function.

When the counter-irritation, by means of the blisters, had been carried to some extent, the ung. iodine was rubbed into the back with decided benefit.

Under this treatment the case daily improved, the pain in the back almost subsided, and she became enabled to endure fatigue. At the expiration of about two months, or ten weeks, she was permitted to take gentle exercise in her ward, and in the exercising ground of the Hospital: subsequently to this period I had an instrument prepared for her similar to the one delineated at page 150, which she was directed to wear for two or three hours daily, and by the aid of which she shortly became enabled to take longer exercise in the open air. From the date of her having the instrument up to

the present time, she has steadily improved; and, though still remaining in the Hospital, she is quite well, and enabled to walk a distance of two or three miles without experiencing fatigue. She will shortly be discharged entirely restored to health, and comparatively strong.

Since writing the above she has been discharged from the Hospital perfectly well.



## CASE XIII.

Miss H——l, æt. 15 years, the daughter of wealthy parents in the county of Surrey, came under my care in the Spring of the present year.

About six months previous to my first seeing her, she was observed to fall away rapidly, and from being exceedingly active and high-spirited, became dull, desponding, and indisposed to motion. She complained of a constant throbbing pain in the back, which was much increased by any exertion. Her countenance grew pale and care-worn, assuming an aged appearance; the appetite became capricious, she was easily fatigued, and in addition to being subject to wake up at night, startled and cried out violently. She frequently passed whole nights without procuring a moment's repose. This state of things increasing, she was advised by her medical attendant to give up all study or mental exertion, and devote her time exclusively to the object of regaining her lost health, and to lie upon her back. The uneasiness in the spine continued to increase, however; cough supervened; and she daily grew weaker, and lost flesh.

About the middle of the month of May, her parents consulted me about her, and at that time her symptoms may be thus described:

Excessive nervous debility was evidenced in every action or movement, and the slightest circumstance served to move her to tears, violent laughter, or some such emotion—her countenance was very pale and care-worn—her eyes sunken—the cheeks hollow—she complained of excessive debility—the whole function of digestion was in a vitiated condition, the bowels rarely acting without medicine—the extremities were constantly cold—slight exertion produced the utmost exhaustion, as well as difficulty of breathing.

Upon examining the spine, I could not detect any trace of deformity, further than a general yielding of the entire column from the effects of weakness. Upon employing percussion, however, I soon discovered the seat of disease. Excessive pain, almost inducing fainting, was experienced when I made pressure upon that portion of the column, comprised between the eighth dorsal and second lumbar vertebræ; and it was in this situation that she complained of the constant throbbing pain, as also of occasional sensations, such as a burning heat, or the trickling of cold water. It was with the utmost difficulty that she could stoop, and even the jarring motion of walking occasioned great uneasiness.

Judging that there existed in the membranes of the spinal cord some degree of inflammatory action, and feeling also, that very probably there was con-

gestion in the rachidian or other spinal veins, I at once determined to place her in the prone position. As soon as I succeeded in getting her to rest here entirely, I began to employ counter-irritation to the seat of morbid action; first, by means of the emp. lyttæ, and afterwards by the application of a strong solution of iodine, or the tartar emetic ointment. I directed her to take pil. hydrarg. gr. v, three nights in the week, following it in the morning with decoct. aloë co.: subsequently I administered alterative doses of hydrarg. c. creta, and pulv. scam. co.

In a very short period I could plainly discover marked signs of improvement. She lost the careworn expression of countenance, and acquired in its place the freshness and vivacity of youth: the pain in the back gradually subsided; and, from being almost unable to move, she now became so active, that it was with difficulty I could induce her to persevere in reclining.

In less than three months from the date of my first seeing her, she had so far recovered, as to be allowed to walk out for an hour daily, with the aid of her instrument. At first, this amount of exertion produced considerable fatigue, and appeared to cause actual debility: I, therefore, judged it advisable to curtail it one-half, which was attended with benefit.

By degrees the capability of taking exercise so

increased, that recumbency was insensibly changed for a state of entire activity; and, at my latter visits, I generally found my patient the foremost in running to greet me. She daily gained strength, the couch became disused, the bowels acted regularly, the pain in the back entirely disappeared, and shortly previous to my ceasing to visit her, the first appearance of the menstrual discharge occurred. Two months since I discontinued my attendance upon her, leaving her quite restored and healthy. I have twice since seen her, and find that she frequently walks a distance of six or seven miles without resting, and without, too, experiencing fatigue or other inconvenience.

LONDON:

CHARLES WOOD, PRINTER, GOULDEN TERRACE, BARNSBURY ROAD, ISLINGTON.



## REPORT

OF AN

## OPERATION

For Removing a Foreign Body

FROM BENEATH THE HEART.

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BY E. S. COOPER, A. M. M. D.

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Published by the San Francisco County Medico Chirurgical Association as an additional paper to its Transactions for the year 1857.

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1857.

SAN FRANCISCO, Sept. 1st., 1857.

E. S. COOPER, M. D.,

DEAR SIR:

At a meeting of the San Francisco County Medical Chiurgical Association, held on Friday Evening, Aug. 21st, 1857, the undersigned were appointed a Committee to publish the case of Mr. Beal, by authority of the Association. For this object we have the honor to request a copy of your Report of said case at your earliest convenience. The Committee undertake the discharge of their duty in the premises with pleasure, the more so, since the successful result of the extraordinary operation upon Mr. Beal must, when fully known, be alike honorable to Surgery, and consoling to Humanity.

Very Respectfully,

M. B. ANGLE, M. D.,  
J. P. MACAULEY, M. D.,  
P. J. REILLY, M. D.  
R. BEVERLEY COLE, M. D.  
DAVID WORSTER, M. D.

*Committee.*

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SAN FRANCISCO, Sept. 1st, 1857.

GENTLEMEN:

Your note of to-day, requesting a Report of the case of Mr. Beal for publication, is before me. In reply, I shall not attempt to burthen my compliance with your request with a pompous affectation of modesty, but would say, that should it be the means of subserving, in the smallest degree, the cause of our noble profession, I shall be glad.

Very Respectfully Yours,

E. S. COOPER.

M. B. ANGLE, M. D.,  
J. P. MACAULEY, M. D.,  
P. J. REILLY, M. D.,  
R. BEVERLEY COLE, M. D.,  
DAVID WORSTER, M. D.

*Committee.*

## R E P O R T .

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MR. PRESIDENT AND GENTLEMEN :

The operation I am about to describe has been the subject of such a variety of comments and so differently represented by the public prints, as well as by parties who were not present, and consequently knew nothing of its real merits, that in giving a true description of the case it appears due to myself to mention this fact, and also to refer to those present at the operation, for confirmation of my report. No one who knew anything of Beal's condition at the time, hesitated to say that he must die without an operation. He expected to die under the knife and gave directions about his burial before the operation began. His friends expected him to die, and were assured that such would probably be the case ; but all wished him to embrace the only remaining chance of prolonging life, and guided by a brave spirit, he most cheerfully took all risk and fortune rewarded his courage.

It has been known from immemorial time that wounds penetrating the cavity of the chest are not necessarily fatal. This knowledge suggested operations upon the thorax in the very infancy of surgery. Accordingly we find that excision of the ribs was practised by Galen in his native village, Pergamus, Asia Minor, while he was still a very young man, as early as the first half of the second century, and by numberless other surgeons up to our own time. (*Mercure de France*, April 1758.) Suif excised two ribs of a man named Botaque, in such a manner as to be able to introduce the fist into the chest. (*Velpeau's Operative Surgery*.) Even the native Fiji Islanders frequently cut through the intercostal spaces by means of a splinter of shell, and extract barbed arrows from the inside of the chest. (*Williams Tonga Islands*.)

The operation of Richerand, where a most extensive section was

made, is well known. Since 1818, the ribs have twice been exsected suceessfully, by Cittadini, by Perey, for earies of two ribs, resulting from gun shot wounds, by M. Blandin, at Beaujon, by Roux, at la Charité, and by Mott, of New York.

But the ease of Rieherand is the only one that bears any resemblance to the one I am about to report. In Richerand's ease "it beecame neecessary to remove the middle portion of four ribs, to the extent of several inches. The pleura, which was greatly thiekened, had also to be removed, so that the pulsations of the heart were exposed naked to the sight." This operation was for eaneer, and the patient died at the expiration of a few months, from the regeneration of the disease. (*Velpeau loc. cit.*)

Wounds of the heart itself are well known not to be neecessarily fatal. Dissections have revealed eieatrices on the heart when the subject had died from an entirely different cause long after the wound had been received. Cases might be cited with names and dates if they were not well known to the learned.

But the demand for surgical interference in cases of foreign bodies in the chest, depends upon the violence of the attendant symptoms and upon the nature of the foreign body itself. Lead for instance will generally become eneysted and cause comparatively little inconvenience after it once stops, while a small bit of iron will produce suppuration and is liable to keep ehanging its location and may therefore produce violent symptoms after months or even years.

CASE.—Mr. B. T. Beal, Æt. twenty-five of Springfield, Tuolumne County, California, with some other young men, in a frolieksome mood, resolved to burst an old gun, and accordingly loaded it with about eighteen inches of powder, to which they connected a slow match and then endeavored to seek security by flight. Unfortunately a brisk wind blew up the powder with great rapidity and the gun exploded before they had retreated far. A slug of iron had been driven into the gun as a temporary breeeh pin, which bursting out in the explosion struck Mr. Beal in the left side below the armpit, fraecturing the sixth rib, entering the chest and lodging, as was afterwards found, beneath the heart upon the vertebral column, just to the right of the descending aorta where it had evidently remained from the period of the injury, January 26th, 1857, until it was removed April 9th, seventy-four days after. In a state of extreme prostration he was brought to the city, having had frequent discharges of several ounces of purulent matter at a time from the cheest through the original wound. The left lung had lost its function, probably less on account of the violence done the lung at the time than from the subsequent accumulation of pus in the eliest, though he had bloody expectoration for a few days. He came to my Infirmary on Mission Street 8th of April, and during the night following had alarming symptoms of suffocation, so much so that I entertained most serious apprehensions that he would not live till morning. So urgent



had his symptoms become that after his arrival he was constantly in absolute danger of dying from suffocation, so that no time was to be lost, even for him to obtain rest from the fatigues of his journey. Under the greatest disadvantages therefore, the operation had to be performed; otherwise he must be abandoned to his fate, which a surgeon feels but little inclined to do in case of such a brave patient who is willing to endure any operation however painful or hazardous to save life.

OPERATION.—The patient being placed on the right side, an incision through the soft parts three inches long was made: commencing opposite the seventh true rib and following the track of the original wound, was carried over the fifth and sixth ribs, which were drawn close to each other by contractions, consequent upon the injury. The sixth true rib was found fractured and slightly carious. A transverse incision three inches long, was now made, beginning at the centre of the first when the soft parts were reflected, so as to expose the ribs. Torsion was applied to one intercostal and two or three small arteries which bled rather freely. The wound was now fully absterged after which an effort was made to find the breech-pin by using the probe. This failing the incisions were lengthened and the ribs further exposed. A portion of the sixth rib which was carious was now removed and was followed by the discharge of about ten ounces of fluid resembling venous blood, contained in a cyst which was broken by the removal of the portion of the rib. A most extensive but careful examination with the probe was now made in order to detect, if possible, the foreign body, yet to no purpose; but air having already been admitted into the chest I unhesitatingly removed portions of the fifth and seventh ribs together with such an additional piece of the sixth as was necessary to make ample room to afford every facility for the further prosecution of the search. Some very firm adventitious attachments were now broken up with the fingers, which gave exit to an immense amount of purulent matter—two quarts at least—which had been entirely disconnected with the fluid first discharged from the chest. The pleura had several large holes through it and was thickened to four or six times its natural state in some parts. The pulsations of the heart in the pericardium could be distinctly seen through these holes. Brandy was now administered freely to the patient who appeared to be rapidly sinking. The left lung was found completely collapsed after the discharge of purulent matter. By giving brandy freely the patient soon began to revive when the search for the foreign body was resumed. At this time the fingers could be placed upon different portions of the heart and feel its pulsations distinctly, but could obtain no clue to the location of the foreign body. The patient now appeared almost completely exhausted. Brandy was given freely. Chloroform was not administered at first, owing to the expected collapse of the left lung on the admission of air into the chest, but a considerable reaction taking place a limited quantity was now used and the manipulations continued.

A sound was introduced and the thoracic cavity explored for at least three-quarters of an hour before anything like a metallic touch could be recognized, and then it was so indistinct as to leave the matter doubtful.

The space immediately above the diaphragm was considered the region in which the metal was most likely to be found ; since the immense amount of supperation which had taken place, it was thought might have dislodged, and gravitation carried it down to the bottom of the chest. The metal not being found here there was no longer any probable opinion to be formed as to its whereabouts, and to describe the difficulties of the search that followed would be difficult if not impossible. No one can have any just conception of the degree of patience required to do what was done, save the one who did it. This is not spoken boastingly, but it is simply the truth. It is sufficient to say that a general exploration of that side of the chest was made, and then it was taken by sections, occasionally passing through holes in the pleura, which latter appeared to have scarcely no normal relations to the surrounding structures, touching by lines the entire surface of the parts, and at last the sound appeared to encounter something of a metallic nature beneath the heart, but the pulsations of that organ were so strong against the instrument as to render it difficult to settle the matter definitely. At last, however, it became evident that the location of the iron was found, and I endeavored to move it out of its position with the point of the sound, in order to get it into a place more eligible for extraction by the forceps. I failed in this, and in manœvering the instrument finally lost the track by which the sound had first passed back of the heart to the metal, and it was during my efforts to recover this, and which was accomplished with the more difficulty owing to some membranes falling in the way, that I discovered the sound had in the first instance reached the metal by passing between the descending aorta and the apex of the heart. The metal being again found, the sound was steadily and strongly held in contact with it until a pair of long lithotomy forceps was thereby conducted to the spot and the breech-pin seized and extracted, which, however, was the work of several minutes, owing to the great difficulty in grasping it even after the forceps was made to touch it. The forceps, however, being heavier, the motion of the heart was not so embarrassing to its manipulations as it had been to that of the sound, but owing to its size it could not follow the sound and be expanded sufficiently to seize the metal without lifting the apex of the heart considerably out of its natural position. After the metal was extracted, the patient was turned on the wounded side, and a tent placed in the track of the original sinus, after which the wound was dressed and the sufferer permitted to rest in bed with his body still inclined towards the injured side.



April 10th.—Greatly prostrate ; slight pain in the left breast ; no motion of that lung ; gave morphine.

April 11th.—Same as yesterday.

April 12th.—Slight cough ; gave enema and light nourishment.

April 13th.—Evacuations from bowels ; slight discharge from the wound, being the first since the operation.

April 14th.—Improving ; considerable appetite.

April 15th.           do           do           do

April 16th.           do           do           do

April 17th.           do           do           do

April 18th.           do           do           do

April 19th.—Considerable cough.

April 20th.—Severe cough to-day and pain in the right side, as also in that of the wound, though not so great as in the other.

Skin dry ; no expectoration ; urine scanty and highly colored. These symptoms were very alarming, the more so from the fact of their implicating the hitherto sound lung.

The pneumonic symptoms continued without abatement for several days and finally subsided, but left the patient greatly prostrate. On the 26th purulent expectoration began and continued to increase for about a week, when nearly a pint was discharged in the space of twenty-four hours, and during this time but little escaped from the wound. After this period, for nearly two weeks, the discharge was greater or less from the wound in proportion to the amount of purulent matter expectorated and vice versa. The matter from both places being of the same quality and occasionally tinged with blood.

At the end of two weeks from the time the communication between the trachea and the original suppurating surface appeared to have been established, the purulent expectoration began gradually to subside, and the patient's condition slowly to improve until the end of seven weeks after the operation, when he left the city. There was no perceptible motion of the left lung at this time. He was considerably fatigued by his journey from the city to the country, and appeared worse for several days in consequence, but eventually began to improve rapidly and continued to do so until three weeks since, at which time, as is well known, he visited this city, and was so improved as not to be recognized by medical men present at the operation, who had seen him every day for some weeks after.

Aug. 1.—*Present condition.*—The external wound has entirely cicatrized. No cough nor pain in the left side—good appetite and all the functions of the system well performed.

The left breast is somewhat sunken, but the upper lobe of that lung has recovered in a great degree its former action. This operation was performed in presence of the following medical men, some of whom assisted—

“ I. Rowell, Censor of San Francisco Medical Society.

“ Wm. Carman, Secretary San Francisco Medical Society.

“ B. A. Sheldon, Vice President, San Francisco Medical Society.

Dr. L. Grover, Member San Francisco Medical Society.

“ J. M. Williamson, Censor of State Medical Society.

“ Wm. Fifer, member State Medical Society.

“ R. Beverly Cole, Pres. S. F. County Medico Chirurgical Association

“ P. J. Reilly, Secretary do. do. do. do. do.

“ L. Hubbard, Ex-Pres. S. F. County Medico Chirurgical Association

“ Wm. Hower, Censor do. do. do. do. do.

“ J. M. Tewksbury, do. do. do. do. do.

“ F. P. Wierzbicki, do. do. do. do. do.

“ J. Lee Webster, do. do. do. do. do.

“ J. P. Macaulay, late Surgeon San Francisco City Hospital.

“ B. F. Hardy, late of Honolulu, S. I.

“ J. S. Calef, Member San Francisco Medical Society, and others.

REMARKS.—The carious condition of the sixth rib was probably a fortunate circumstance in this case, since it favored the formation and continuation of a sinous opening through which purulent matter was discharged from time to time, prior to the operation, and which limited, to some extent, the immense accumulation that, as it was, had nearly terminated the patient's life previous to that period.

His subsequent astonishing recovery is attributed to his great cheerfulness, good constitution, and to the effects of our unparalleled climate, in which it appears nearly impossible for a patient to die with almost any ordinary degree of injury, provided a reasonable share of attention is afterwards given him. San Francisco has the advantage of every other city on the globe, in regard to climate, for surgical operations, since, if owing to any peculiarity of the case, our coast breezes are not equally well adapted to all the stages of convalescence after an operation, it is an easy matter to obtain almost any desirable change by half a day's easy travel, which I think can be said of no other city.

In Mr. Beal's case, while nothing could have been better than our cool bracing atmosphere, for the first few weeks after the operation still, having recovered from the immediate effects of that, the subsequent lung symptoms were much better controlled by a removal to the Santa Clara Valley, thirty miles distant, than they could possibly have been by medicine, conjoined with the greatest care that could have been bestowed upon him in this city.











